meta

the news digest magazine

Volume XXVI - No. 10 October, 1953

NEWS!!

A new Austempering-Martempering Quenching Salt

Holden Marquench No. 296

Useable quenching range—350-700° F.

This product contains a chloride coagulant which separates out the chloride content in your salt bath into an easily removed slurry. Contrary to normal sludges which currently develop in the average marquenching austempering operation, this slurry or chloride sludge is easily removed and is not re-assimilated by the salt bath during your quenching operation.

HOW TO USE

1. If you are now using a nitrate quenching salt, you will advise us how many pounds of quenching salt is in your austempering-martempering furnace.

2. We will advise how much Marquench Additive #356 to purchase, which will avoid the necessity of your bailing out the furnace.

In normal operation, four pounds of Marquench Additive #356 will reduce your chloride content from 15 to 7½%. Once the Marquench Additive #356 has reduced your chloride content to the proper level, then additions of Marquench #296 material are made to your bath.

TESTING

No chemical tests are necessary. With our salt bath the normal melting point of salt is 295°F. Sample the quenching bath daily or weekly and allow it to cool and take a melting point test to determine the percentage of chlorides by the change in melting point. If the melting point is 310 or 325, additional Marquench Additive #356 can be added, usually not to exceed four pounds per 100 pounds of salt bath in the pot, and this should settle out the chlorides so that your melting point will be in the 295 to 300 range, which will approximate ½ to 2% of total chloride.

There should be no residual sludge showing in the glass beaker provided the Marquench #296 is properly used or additions of the Marquench Additive #356 are used when required, depending on operating conditions.

IMPORTANT! The advantage of this development is the maximum quenching efficiency of a nitrate-nitrite compound in continuous production without any bail out of material other than sludging.

Write for representative to call on you so you can eliminate bail out and throwing away of quenching salt.

THE A. F. HOLDEN COMPANY

P.O. Box 1898
New Haven 8, Conn.

3311 E. Slauson Avenue
Los Angeles 58, Calif.

11300 Schaefer Highway
Detroit 27, Michigan

Metals Review

THE NEWS DIGEST MAGAZINE • VOLUME XXVI, No. 10 October, 1953

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IMPORTANT MEETINGS

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ASM REVIEW OF METAL LITERATURE

Jacksonville Holds Successful Initial Meeting

Reported by Kingston G. Wolf

Magnetic and Fluorescent Department
U. S. Naval Air Station

The initial meeting of the newly organized Jacksonville Chapter of the American Society for Metals was held in September with approximately 75 in attendance. H. J. Huester, Commander, U.S.N.R., chairman, extended a cordial welcome to the members, guests and visitors, and stated briefly the aims and objectives of the Society.

(Above) Partial View of the Attendance at the First Meeting of the Jacksonville Chapter. (Left) Dr. Finlay, Rem-Cru Titanium Corp., demonstrates a titanium fishing reel he made to an interested audience. From left are: Mr. Martin, Jacksonville Chamber of Commerce; Dr. Finlay; Cdr. Huester, chairman; L. D. Coates, Jr., Naval Air Station; and A.S.M. Secretary Eisenman

The technical portion of the meeting included a talk on "Titanium—Florida's Latest Contribution to the Structural Metals Field", given by Walter L. Finlay, research manager of Rem-Cru Titanium Corp. The information provided by Dr. Finlay was most interesting to the audience since the location of the principal supply of titanium-bearing ores is located in and near Jacksonville. Dr. Finlay presented a history of titanium—from discovery through all phases of production to the finished product. A fishing reel made of titanium by Dr. Finlay proved to be a lively subject of discussion since Jacksonville is known for its large number of fishermen, each of whom attempted to get his name on the waiting list for one of these beautiful reels.

William H. Eisenman, national secretary, was honored guest of the evening. He discussed the Society and how it serves the metals industry, and explained in detail the intent and purpose of A.S.M., the educational program which the Society sponsors, and the special science awards which have recently been made possible through national headquarters.

The Jacksonville Chapter promises to be an outstanding organization in the southeastern part of the United States, due in part to the excellent cooperation offered by the local Chamber of Commerce, civic authorities and other professional engineering organizations. Publicity was generously given the first meeting of this new chapter by the local newspapers, the Naval Air Station news organs and special bulletins.

Future Scientists Solicit Material for Inventory

Any industrial organization that sponsors scholarship awards or other types of incentive programs directed toward science and engineering students and their teachers is invited to submit brief descriptions of these programs to the Future Scientists of America Foundation.

This Foundation is preparing an inventory publication in the hope of adding to the effectiveness with which these programs encourage young people to explore careers in science and the science-related industries. In addition, the Foundation is preparing a list of career guidance materials and will be glad to have organizations submit samples of such materials.

Organizations desiring to participate may obtain copies of the inventory form from the Future Scientists of America Foundation, National Science Teachers Association, 1201 16th St., Washington, D. C.

IMPORTANT MEETINGS
for November

Nov. 2-6—American Institute of Electrical Engineers. Fall General Meeting, Muelebach Hotel, Kansas City, Mo. (H. H. Henline, Secretary, A.I.E.E., 33 W. 39th St., New York 18, N. Y.)

Nov. 5-6—Mellon Institute of Industrial Research. 11th Annual Diffraction Conference. Mellon Institute, Pittsburgh, Pa. (H. R. Letner, Mellon Institute, Pittsburgh 13, Pa.

Nov. 9-12 — The Wire Association. Annual Convention. LaSalle Hotel, Chicago, Ill. (Edmund D. Sickels, *Wire and Wire Products,* 453 Main St., Stamford, Conn.)

Nov. 11-14—Society of Naval Architects and Marine Engineers. 61th Annual Meeting. Waldorf-Astoria, New York, (W. N. Landers, Secretary, S.N.A.M.E., 29 W. 39th St., New York 18, N. Y.

Nov. 19-20—National Association of Corrosion Engineers. Fall Conference of Western Region, Biltmore Hotel, Los Angeles, Calif. (F. T. Wood, Jr., N.A.C.E., Douglas Aircraft Co., Inc., Santa Monica, Calif.

Hanke Explains Ugine-Sejournet Extrusion Process

Reported by John M. Gerken
Rensselaer Polytechnic Institute

The Eastern New York Chapter began the current season with a technical session on the "Ugine-Sejournet Process for Extrusion of Stainless Steel Tubes," presented by G. A. Hanke, Jr., Allegheny Ludlum Steel Corp., extrusion department.

Until fairly recently the extrusion of steel shapes was made difficult by the high temperatures and pressures required. Grease and tallow lubricants were used successfully for low carbon tubes in Germany. During the occupation of France, ordinary window glass was used as an extrusion lubricant. Since then, a glass lubricant has made it possible to extrude stainless steel into tubing and special shapes.

A fully integrated tube mill was built by Allegheny Ludlum after making a study of the Ugine-Sejournet process in operation in France.

A series of fully automatic operations is performed on each billet before extrusion. It is conditioned by turning and then heated to the working temperature in a salt bath furnace to prevent scaling. Next, it is upset and pierced in a vertical cylindrical liner. A final blanking operation completes the pierced billet hole and removes the punch nose, making it ready for extrusion. At this point there is about 1 lb. of waste for a billet weighing from 50 to 150 lb.

During the extrusion the die, mandrel and billet surfaces must be lubricated. Originally, a woven fiberglass sock was used over the mandrel. However, powdered glass was found to be just as effective and more economical in this case. Glass in the form of a fiberglass mat is used between the die and the billet. A flat surface around the die opening serves as a reservoir for the glass lubricant.

After the billet is in place, the ram and mandrel are advanced under low pressure (250 psi.), at a speed of 900 in. per min., until contact is made. At this velocity the impact force is almost sufficient to upset the billet. Extrusion is performed at a water pressure of 3150 psi., resulting in a ram force of 1675 tons. At the higher extrusion ratios, the speed at which the product leaves the press approaches 2000 ft. per min. The glass remaining on the extruded product after cooling is removed in a pickle of 10% hydrofluoric acid.

Mr. Hanke gave three reasons for extruding stainless steel shapes—some shapes are too intricate to roll; lower die costs make extrusion more economical than rolling in small quantities (15 to 20 tons is necessary to make rolling more economical); and some alloys which tend to break up on rolling are much more amenable to extrusion.

Panel Argues the Pros and Cons of Ferrous Castings

Reported by Knox A. Powell
Research Engineer
Minneapolis-Moline Co.

The Minnesota Chapter heard a panel composed of local members discuss the advantages and disadvantages of various types of "Ferrous Castings" at their first meeting this season.

A series of 15-minute talks were given by C. Fred Quest, Quest Foundry Co., who spoke on "Grey Iron"; John Hermanson, Prospect Foundry Co., who spoke on "Ductile Iron"; George T. Boli, Northern Malleable Iron Co., who spoke on "Malleable Iron"; H. H. Blosjo, Minneapolis Electric Steel Castings Co., who spoke on "Cast Steel"; and Jack Rausch, who spoke on "Investment Castings". The panel was moderated by R. L. Dowdell, who highlighted the outstanding points of flexible shapes, ductility, wear resistance, strength and cost.

Mr. Dowdell followed up the talks with a fast-moving series of questions on ferrous casting which he had arranged to extend the scope of the coverage of the subject and its application to audience interest. Questions ranged from a frank—why blow holes?—to the highly technical relation of alloy content to heat treatment temperature change rates.

Welding and Cutting Discussed at Syracuse

Reported by James A. Miskelly
Electronics Laboratory
General Electric Co.

The initial meeting of the Syracuse Chapter featured John M. Parks, manager of the metallurgical process division, Air Reduction Research Laboratory, who presented a lecture on "Recent Developments in Welding and Cutting".

Dr. Parks discussed in some detail the relationship of surface cold work to the shear strength of the welded joint, and the lower transition temperatures found in hydrogen-free welds. His talk was accompanied by a high-speed color film of the actual arc drawn during metal deposit for argon and helium-protected metals.

Short Course in Corrosion

"Cathodic Protection" will be the subject of a 3-day corrosion course to be given at the University of California at Los Angeles, Nov. 16 to 18, 1953. Registration will be limited to 110 persons. The course will be directed toward training maintenance and operating personnel in installation and maintenance of cathodic protection systems in the field.

Sessions will last six hours daily and will include the following topics: basic electrochemical principles, corrosion circuit theory, corrosion engineering, instruments and measuring techniques, design and application of cathodic protection, and economics of cathodic protection.

The short course will be followed by the Western Region Division Conference of the National Association of Corrosion Engineers to be held at the Biltmore Hotel in Los Angeles, Nov. 19 to 20, 1953.

Application of Metals Is Theme of Kansas City Course

The Kansas City Chapter is offering an educational lecture series on "Ferrous and Nonferrous Metals Application" this year. The course is designed to acquaint all persons in the metalworking field with the application, uses and limitations of the more important products of the industry. The course will be conducted on the practical, down-to-earth lecture-discussion style rather than on an academic or theoretical plane.

Subjects such as commercial steels, engineering steels, stainless, ferrous and nonferrous castings, aluminum, magnesium, and testing methods will be discussed by local men who are experts in their field, or by nationally known experts for subjects in cases where deemed necessary. The fee of $10 for members and $15 for nonmembers will include one of several technical books related to the subject matter discussed and may be selected by the individual attending according to his preference. Hugh A. Springer, metallurgist, Sheffield Steel Corp., is chairman of the Kansas City Educational Committee.

Open Extrusion Plant

The first aluminum extrusion plant to be located in the Gulf Coast Area will be opened this month in Houston, Tex., heart of a rapidly growing aluminum industry. Known as May, Inc., the company will be headed by Doyle M. May, president and well-known Houston manufacturer. Advisability for locating the plant in Houston is two-fold. Houston is one of the most desirable locations in the country because of its close proximity to a vast aluminum-producing area — 40% of America's and 16% of the world's raw aluminum is produced within a 399-mile radius of Houston; and an extrusion plant in this area means aluminum shapes for manufacturers at lower cost because of the minimized transportation mileage. Houston, with its vast network of transportation facilities, is easily accessible for the entire manufacturing district.

The plant will be staffed with engineers experienced both in the production of aluminum extrusions and the design of products using them.

Columbus Chapter Meets Newly Elected Officers

New Officers of the Columbus Chapter Include, From Left: O. D. Rickly, L. H. Marshall Co., Treasurer; A. B. Westerman, Battelle Memorial Institute, Chairman; E. J. Bleakley, Jeffrey Mfg. Co., Past Chairman; F. H. Beck, Ohio State University, Vice-Chairman; and R. E. Christin, Columbus Bolt & Forging Co., Secretary

Penn State Opens New Lab

The Pennsylvania State College has announced the opening of a new metal processing research laboratory which is destined to fill an important role in the metallurgical training program of the school of mineral industries. Although installation of all the essential equipment is incomplete, several new metal melting and processing units have been installed and are ready for use in the current semester.

The major purpose of the new laboratory, according to W. J. Reagan, associate professor of metallurgy, will be the training of students in the use of melting and processing units, enabling them to obtain firsthand information regarding iron and steel making practices. The laboratory will also provide equipment for conducting research on various projects. It is hoped that eventually equipment may be obtained for use in a program of foundry metallurgy, to include studies in the fields of both steel castings and cast irons.

Consulting Firm Designs Lab

Sam Tour & Co., Inc., has completed a project involving the design of a completely equipped laboratory to handle analytical and assay work at the newly developed mine of the Orinoco Mining Co., in Cerro Bolivar, Venezuela.

The laboratory has been designed to operate for a period of six months without additional supplies, a degree of self sufficiency required because the mine is so remotely located.

Plans developed by the consulting firm include procedures for all analyses to be performed in the laboratory, time-saving methods for labeling samples and recording results, and personnel direction.

Foundry Consultant Dies

John Howe Hall, 72, steel foundry consultant and member of the advisory staff of *Foundry,* died Aug. 4, 1953, at Tarrytown, N. Y. Educated at Harvard University, he completed work for his bachelor degree in three years, and obtained a M.S. degree in the fourth, graduating in 1903. A fifth year was spent under direction of Professor Albert Sauveur, conducting research work on vanadium steel.

From 1904 to 1906 he was associated with Bethlehem Steel Co., where he became assistant superintendent of the crucible steel department. After a summer as crucible steel melter with Buffalo Crucible Casting Co., Mr. Hall joined Taylor-Wharton Iron & Steel Co., where he remained until 1937, when he became a consulting metallurgist in New York. From 1942 to 1945 he was assistant metallurgist for General Steel Casting Corp.

During his service with Taylor-Wharton, Mr. Hall was responsible for a number of developments. He was the first to use the so-called intermediate manganese in steel castings, and introduced the practice of quenching and reheating alloy steel castings, previously considered impractical. He developed a welding rod for manganese steel, worked out a procedure for melting ferromanganese in the cupola, supervised the first successful use of the electric furnace for melting manganese steel, and solved the problem of remelting manganese steel scrap in the electric furnace. Mr. Hall also developed a method for pouring small alloy steel castings directly from high-frequency electric furnaces without interrupting the power. He did considerable pioneer work in manufacture of small stainless steel castings, using that pouring method as well as substitutes for silica sand to obtain smooth surfaces.

Mr. Hall wrote numerous papers on steel foundry practice for various technical societies and the technical press. He was author of "The Steel Foundry" and several chapters of the "ABC of Iron and Steel" (5th ed.). He served on committees of various technical societies, and was the first recipient of the J. H. Whiting Gold Medal Award of the American Foundrymen's Society.

Wins Engineering Award

Joseph C. Danec, assistant to the production engineer, abrasive and wheel division, Norton Behr-Manning Overseas, Inc., received the Admiral Ralph Earle Award of the Worcester Engineering Society for his work in powder metallurgy, particularly in connection with the steel center diamond abrasive cut-off wheel used in the radio industry for sawing, slicing and dicing quartz oscillator crystals. Mr. Danec developed the idea that a rim containing diamonds could be firmly attached to a rigid steel body. The wheels are now being produced as a result of his work and are not only in use in the radio-quartz crystal industry, but have paved the way for development of a segmental diamond abrasive wheel to cut stone, granite, marble, ceramic tile, refractories and concrete.

J. C. Danec

Mr. Danec is vice-chairman of the Worcester Chapter.

Hotel Credit Card System Established

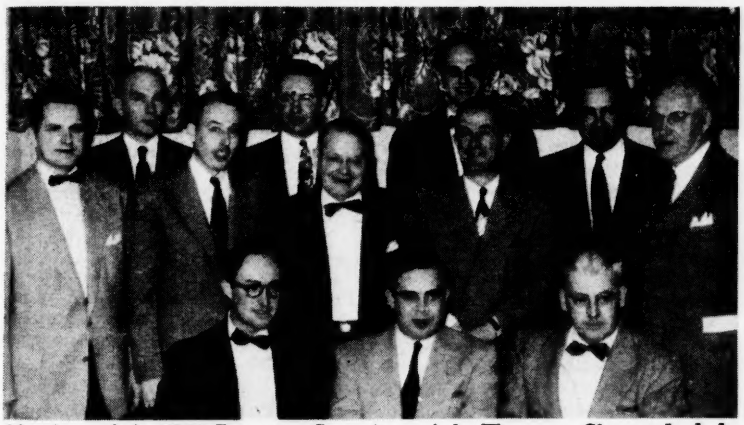
A new credit plan, perfected for travelers by the American Hotel Association, will be honored by hotels in the United States, Canada, Mexico, Alaska, Puerto Rico, Hawaii and Bermuda. Cards, which will enable the public to travel without an oversupply of identification papers, or credit cards, are of two types.

The first, "Travelcard", will be issued to business firms for the use of their executives and employees who travel. It assures the holder of unlimited credit for charging of hotel bills, including food and other charges, plus check-cashing privileges within the limit of individual hotel policy. A fee of $5 a year is charged for each Travelcard issued.

The second type, the "Chekards", will be issued to individuals who have satisfactory credit records. They will provide check-cashing privileges at participating hotels and the holder may cash $100 worth of checks per week for a charge of $6 per year, $200 for $9 a year, and $300 for $12 a year.

Travelcards and Chekards will be issued to business firms or individuals who apply for them by writing to the American Hotel Credit Corp., Greenwich, Conn.

Worcester's Executive Committee Members



Members of the 1953 Executive Committee of the Worcester Chapter Include, Standing, From Left: W. J. Nartowt, Greenman Steel Treating Co.; H. L. Jones, Worcester Gear Works, Inc.; S. M. Jablonski, Wyman-Gordon Co.; James F. Dempsey, Bay State Abrasive Products Co.; E. G. Nordwell, Worcester Stamped Metal Co.; L. M. Stern, North American Mfg. Co.; W. J. Johnson, Massachusetts Steel Treating Corp., Past Chairman; L. G. Shaw, Pratt & Inman, Secretary-Treasurer; and W. B. Dennen, Boys Trade High School. Seated, from left, are: J. C. Danec, Norton Behr-Manning Overseas, Inc., vice-chairman; H. J. Elmendorf, American Steel & Wire Co., chairman; and H. D. Berry, Thomas Smith Co. (Photo by C. W. Russell)

Australian Metallurgists Hold Meeting in Brisbane

The Sixth Annual Meeting of the Australian Institute of Metals was held during the last week of May in Brisbane, the youngest of the six State Branches of the Institute. Sixty-five interstate delegates joined a similar number of Brisbane members in a full program of technical discussions, industrial visits and social gatherings.

Clement Blazey of the Port Kembla Branch was elected president of the Institute for the coming year. F. T. M. White, past president, talked on "Man—the Metallurgist", tracing the history of the discovery, development and use of metals from prehistoric times to the present.

The Invitation Lecturer, F. A. Fox, assistant controller of research of the Commonwealth Department of Supply, talked on "Recent Developments in Light Alloys". The two technical sessions of the meeting were on "Rare Metals—Their Production and Utilization", and "Copper and Copper-Base Alloys".

Cyril Bath Opens New Plant

A two-million dollar plant was opened in Solon, Ohio, by Cyril Bath Co. in August. The company, formerly located in Cleveland, manufactures the Bath radial drawformer, which consists of a huge rotating table and two hydraulic rams, to stretch form the toughest new metal alloys needed for jet engines.

The one-floor steel frame building houses factory, general and executive offices, and covers 50,000 sq. ft. of space.

Notes on a "Retired" Metallurgist

A. Floyd Whalen, metallurgist and consultant who has, in his own words, "been put out to pasture" since 1946, reports that despite his retirement he has little time to spare. He is vice-president and publicity man for a large bible class in Harrisburg, Pa., and vice-president and chairman of the tour committee of the County Historical Society. He was elected treasurer of the Engineers Society of Pennsylvania, and is a member of the local chapter of the American Chemical Society, as well as a local organization called the Keystonians who hold monthly dinners and hear speakers on State subjects.

Mr. Whalen regularly attends the monthly meetings of the York Chapter, and gives an annual lecture on chemistry or metallurgy at the John Harris High School. He will be a 25-year member of A.S.M. in 1954.

Austin Speaks at Officers Night in Washington

Reported by Richard Raring
Naval Research Laboratory

James B. Austin, nominee for A.S.M. president, addressed the Washington Chapter at the annual National Officers' Night meeting.

Dr. Austin's lecture, "Magnification in Time", illustrated by motion pictures, demonstrated the application of motion pictures made at high speed in the solution of a variety of problems in metallurgy. Both the pictures and the speaker's interpretation of them impressed on the audience the fact that just as the microscope magnifies length, thus enabling us to see objects too small to be seen by the unaided eye, so the high-speed camera "magnifies" time and enables the eye, proverbially slower than the hand, to see, and study at leisure, events which would otherwise escape detection.

Gravity Awards Offered

The Gravity Research Foundation has announced that it is offering awards for the best 1500-word essays on the possibilities of discovering (a) some partial insulator, reflector or absorber of gravity, (b) some alloy, or other substance, the atoms of which can be agitated or rearranged by gravity to throw off heat, or (c) some other reasonable method of harnessing the power of gravity.

A top award of $1000 and nine awards of $100 or $50 will be made on Dec. 1, 1953. For full information write: Gravity Research Foundation, New Boston, N. H.

The Foundation is seeking a printed list of metallurgists to use as a mailing list and would appreciate being advised of the availability of such a list.

Science Achievement Award Winners—1953

Awards consisting of $100, $50 and $25 Savings Bonds and Honorable Mention Achievement Certificates will be made to the following 214 high-school students for their winning entries in the 1952-53 Science Achievement Awards program sponsored by the A.S.M. and conducted for the Future Scientists of America Foundation by the National Science Teachers Association.

Awards are divided into three groups—grades 7-8, grades 9-10, and grades 11-12, and separate awards are made among various regions of the country. In the first two groups, subject matter can be taken from any field of general science; in grades 11-12 the subject must be taken from the field of metals or bear relationship to the field of metals. Presentation of Awards will be made at the students' schools during the early weeks of the present term. Whenever possible an A.S.M. representative and a representative of the National Science Teachers Association will participate in the formal ceremonies of awards.

The purpose of the A.S.M.-sponsored Science Achievement Awards program is to recognize and in a measure reward students whose abilities and interests can be developed through guidance and encouragement in their schools. The goal of the A.S.M. is to further the aim of the classroom; namely, to better general science education for all students, so that science and engineering, so vital to our economy and security, will always have qualified candidates for future careers in these fields.

Science Achievement Award Winners are listed by geographical districts. First Place Winners appear in bold face.

ALABAMA

Fred Wallwork—Telescope Fun—16 years old; 10th grade, West End High School, Birmingham, Ala. (H.M.)

Robert J. Brinson—Electrostatics—17 years old; 10th grade, Lanier High School, Montgomery, Ala. (H.M.)

Alice Faye Hassler—Constructing a Geiger Counter—17 years old; 12th grade, Ensley High School, Birmingham, Ala. (H.M.)

ARIZONA

John Robson—The Reaction of Plant Seedlings to Gravity—16 years old; 10th grade, North Phoenix High School, Phoenix, Ariz. (H.M.)

Eldridge Moores—Effect of Gravity on the Roots and Stems of the Corn Seedling—14 years old; 10th grade, North Phoenix High School, Phoenix, Ariz. (H.M.)

Carol Stoldt—Fermentation Studies of Raw and Pasteurized Milk—15 years old; 10th grade, North Phoenix High School, Phoenix, Ariz. (H.M.)

William Collier—Finding the Genetic Make-Up of a Hooded Rat—15 years old, 10th grade, North Phoenix High School, Phoenix, Ariz. (H.M.)

Gene C. Falck—Impurities in Crystallization—16 years old; 11th grade, Phoenix Union High School, Phoenix, Ariz. (H.M.)

ARKANSAS

Jack Austin—Motor—14 years old; 9th grade, Fort Smith Junior High School, Fort Smith, Ark. (H.M.)

Jack Austin—Magnetic Diver—14 years old; 9th grade, Fort Smith Junior High School, Fort Smith, Ark. (H.M.)

Robby McGrew—Self-Starting Electric Motor—14 years old; 9th grade, Fort Smith Junior High School, Fort Smith, Ark. (H.M.)

Robby McGrew—Pocket-Size Crystal Receiver—14 years old; 9th grade, Fort Smith Junior High School, Fort Smith, Ark. (H.M.)

CALIFORNIA

Jeanne Ruenitz — Wild Flowers of Southern California—12 years old; 7th grade, Lincoln Junior High School, Santa Monica, Calif.

Marilyn Brooks—The Web of Life, Distributions of Fauna and Flora of the Northern Hemisphere—13 years old; 8th grade, Lincoln Junior High School, Santa Monica, Calif. (Second Place Award)

Carl Svoboda—High-Frequency Apparatus—13 years old; 8th grade, Woodrow Wilson Junior High School, Oakland, Calif. (Second Place Award)

Marvin Stanley — Salamanders and Newts at Home—13 years old; 8th grade, McChesney Junior High School, Oakland, Calif. (H.M.)

Harley Blankenship—Climatic Conditions at Lava Caves—15 years old; 10th grade, Tulelake High School, Tulelake, Calif. (Second Place Award)

Kyrk Reid—My Work With Hartmanella in the Kingdom of the Invisible—14 years old: 9th grade, Carmel High School, Carmel, Calif. (H.M.)

Roderic Thomas—A Study in Luminescence—17 years old; 12th grade, El Cerrito High School, El Cerrito, Calif. (Second Place Award)

Richard Robertson—A Study of the Structures and Thermal Effects of Steel—17 years old; 12th grade, Berkeley High School, Berkeley, Calif. (H.M.)

CONNECTICUT

June and Theodore Neumann—Krilium—Soil Conditioner—14 and 15 years old; 8th grade, Noah Wallace Junior High School, Farmington, Conn.

Carol DiTrocchio — Regeneration of Planaria—13 years old; 8th grade, Noah Wallace Junior High School, Farmington, Conn.

Sandra Goodwin — Penicillin — The Wonder Drug—13 years old; 8th grade, Noah Wallace Junior High School, Farmington, Conn. (Second Place Award)

Patricia Pascus — A Study of the Blood—15 years old; 9th grade, Noah Wallace Junior High School, Farmington, Conn.

Ethan Smith—A Method of Locating Objects in Space—14 years old; 9th grade, Center Junior High School, Norwalk, Conn. (H.M.)

Albert Petersen, Jr.—Iron and Steel — Reduction and Refining — 17 years old; 12th grade, Farmington High School, Unionville, Conn. (H.M.)

DELAWARE

Peter Radding—Engineering—Communications—13 years old; 8th grade, Seaford Special School, Seaford, Del.

DISTRICT OF COLUMBIA

Don Scott Lang — Producing Cold From Heat — 12 years old; 7th grade, Langley Junior High School, Washington, D. C.

Martha Blake — Prehistoric Horses and Those of Today—13 years old; 8th grade, MacFarland Junior High School, Washington, D. C. (Second Place Award)

J. Paul Reason—Photoelectric Cell for Wire-Photo—12 years old; 7th grade, Banneker Junior High School, Washington, D. C. (Second Place Award)

Philip Lichtman—Astronomical Photography With Homemade Telescopes and Cameras, and a Study of Lunar Motions—16 years old; 10th grade, Woodrow Wilson High School, Washington, D. C.

Eugene Herman—Grow Your Own Herbs in a Windowbox—16 years old; 10th grade, Calvin Coolidge High School, Washington, D. C. (H.M.)

Robert Bluehdorn—Tape Recording—18 years old; 12th grade, Woodrow Wilson High School, Washington, D. C. (H.M.)

FLORIDA

Alvin D. Robins—Water in the Service of Mankind—12 years old; 7th grade, Ida M. Fisher Junior High School, Miami Beach, Fla. (H.M.)

Charles Yulish — Atomic Energy — Blessing or Curse?—16 years old; 11th grade, Miami Beach Senior High School, Miami Beach, Fla.

Mary Clare Langan—Weather Observations—17 years old; 12th grade, Clearwater High School, Clearwater, Fla. (H.M.)

GEORGIA

Nancy Wilson—My Studies of Bacteria—13 years old; 8th grade, Laboratory High School, Collegeboro, Ga.

Horace Hillsman—A House Wiring System—13 years old; 8th grade, Howard High School, Atlanta, Ga. (Second Place Award)

Jack Venable—Six-Inch Newtonian Telescope—14 years old; 9th grade, Northside High School, Atlanta, Ga.

Jerry Ayers—A Home-Made Planetarium—14 years old; 9th grade, Brown High School, Atlanta, Ga. (Second Place Award)

Don Hartwig and Jon Traer—Principle of the Jet Engine—14 years old; 9th grade, North Fulton High School, Atlanta, Ga. (Second Place Award)

Billy Wright—Brownian Movements—18 years old; 12th grade, North Fulton High School, Atlanta, Ga. (Second Place Award)

Richard Dix—A Study of Some Thermal Characteristics of Insulating Materials—16 years old; 11th grade, Brown Community High School, Atlanta, Ga. (Third Place Award)

ILLINOIS

Sandra Mueller—Dissecting Animals—13 years old; 8th grade, Haven Junior High School, Evanston, Ill.

Alden Campbell—The Microscope—Its Parts and Use—14 years old; 8th grade, Haven Junior High School, Evanston, Ill.

Eugene Mohr—Geiger Counter—13 years old; 8th grade, Haven Junior High School, Evanston, Ill. (Second Place Award)

Harris Sullivan—Steam-Powered Direct Current Generator—13 years old; 8th grade, Haven Junior High School, Evanston, Ill. (H.M.)

Buckley Smith—Electrically Driven Hand Made Truck—13 years old; 8th grade, Haven Junior High School, Evanston, Ill. (H.M.)

Albert Huggard — Exploring the Weather—13 years old; 7th grade, Nichols Intermediate School, Evanston, Ill. (H.M.)

Robert McLean—Metallic Elements—13 years old; 7th grade, Haven Junior High School, Evanston, Ill. (H.M.)

Ronnie Larsen — Photography — 13 years old; 8th grade, Haven Junior High School, Evanston, Ill. (H.M.)

Karl Barthelmess—Radio and the Effect of the Ionized Layer—13 years old; 8th grade, Upper Haven Junior High School, Evanston, Ill. (H.M.)

Dick Dunham—Experiment in Composting—14 years old; 9th grade, York Community High School, Elmhurst, Ill. (Second Place Award)

Edmund Richards—An Original Approach to Radio-Carbon Dating—17 years old; 12th grade, Belleville Township High School, Belleville, Ill.

William W. Gothard, Jr.—Photography in the Science of Developing Steel—18 years old; 12th grade, Lyons Township High School, La Grange, Ill. (Second Place Award)

Barry Berman—Interconversion of Energy—17 years old; 12th grade, Von Steuben High School, Chicago, Ill. (H.M.)

INDIANA

Bruce Klepinger — The Study of Rocks and Minerals—13 years old; 7th grade, St. James Lutheran School, LaFayette, Ind. (Second Place Award)

Patricia Chapman and Judy Haynes—Hydroponics—14 and 13 years old; 8th grade, Roann High School, Roann, Ind. (Second Place Award)

James Barnes — Tissue Culture of Chick Embryo—16 years old; 10th grade, Thomas Carr Howe High School, Indianapolis, Ind.

Robert Little—Medical Mycology—16 years old; 10th grade, Thomas Carr Howe High School, Indianapolis, Ind. (Second Place Award)

Joanne Brown — Micro-Dissection of Daphnia—16 years old; 10th grade, Thomas Carr Howe High School, Indianapolis, Ind. (Second Place Award)

Edward Lollis—Habits of Bluebirds as Observed in a Series of Birdhouses—15 years old; 10th grade, Thomas Carr Howe High School, Indianapolis, Ind. (H.M.)

Beatrice Crouse—Artificial Parthenogenesis on Toad Eggs—15 years old; 10th grade, Thomas Carr Howe High School, Indianapolis, Ind. (H.M.)

Hoyt Miller—Kodachromes of Pig Dissection—16 years old; 10th grade, Thomas Carr Howe High School, Indianapolis, Ind. (H.M.)

David Stevenson — Magnetic Tape Recording—16 years old; 11th grade, Elmhurst High School, Fort Wayne, Ind. (H.M.)

Patrick Ledden — Alumina Chromatography — 16 years old; 11th grade, Central Catholic High School, Fort Wayne, Ind. (H.M.)

Mary Ellen Bendel—Chlorophyll Extraction—17 years old; 11th grade, Central Catholic High School, Fort Wayne, Ind. (H.M.)

Patricia Junk—Carotenoids—16 years old; 11th grade, Central Catholic High School, Fort Wayne, Ind. (H.M.)

KANSAS

Gary Losh—Meteorology—13 years old; 8th grade, Roosevelt Junior High School, Coffeyville, Kan. (Second Place Award)

KENTUCKY

Verdie Rogers—Rocks of the United States—14 years old; 8th grade, Lexington Junior High School, Lexington, Ky. (H.M.)

Phyllis Franz—Rocks of the Blue Grass Region—13 years old; 8th grade, Lexington Junior High School, Lexington, Ky. (H.M.)

Nan Harb—Shells—13 years old; 8th grade, Lexington Junior High School, Lexington, Ky. (H.M.)

Mary Feeney—The Effect of Aureomycin on Healthy Chickens—14 years old; 9th grade, Holy Rosary Academy, Louisville, Ky. (Second Place Award)

Emery White—Construction of a Final Amplifier Stage Free From Unwanted Harmonics—15 years old; 10th grade, Glasgow High School, Glasgow, Ky. (H.M.)

Mary Shafer—Agents of Corrosion—18 years old; 12th grade, Holy Rosary Academy, Louisville, Ky. (H.M.)

Clara Riedley — Metals in Home Kitchen Chemistry—17 years old; 11th grade, Holy Rosary Academy, Louisville, Ky. (H.M.)

LOUISIANA

Charley Payne—Extraction of Oils—15 years old; 9th grade, Union Central High School, Columbia, La.

MARYLAND

James Matousek—Steam Engines—13 years old; 8th grade, Benjamin Franklin Junior High School, Baltimore, Md. (Second Place Award)

Leslie Paff—Model Rocket—13 years old; 8th grade, Benjamin Franklin School, Baltimore, Md. (H.M.)

Morgan Hall—Space Flight—14 years old; 8th grade, Benjamin Franklin School, Baltimore, Md. (H.M.)

Philip Specht—Model Seismograph—14 years old; 8th grade, Kensington Junior High School, Kensington, Md.

Robert Ambrose—Effects of Krilium on the Nitrogen Contents of Legume Nodules—15 years old; 10th grade, Northwestern High School, Hyattsville, Md.

Amy Evelyn Harvey — Diatoms—16 years old; 10th grade, Northwestern High School, Hyattsville, Md. (Second Place Award)

Mildred Elder—Color Preference in Bird Feeding—15 years old; 10th grade, Northwestern High School, Hyattsville, Md. (Second Place Award)

Bette Coder—A Study of Chick Embryos—15 years old; 10th grade, Northwestern High School, Hyattsville, Md. (H.M.)

Sally Groome—New Lily Bulbs From Old Stems—16 years old; 10th grade, Northwestern High School, Hyattsville, Md. (H.M.)

Jane Gager — Artificial Lightning's Electrical Effect Upon the Growth of Plants—15 years old; 10th grade, Northwestern High School, Hyattsville, Md. (H.M.)

Marguerite Shepard—Blood Types of 10th Grade Girls at Eastern High School in Comparison With the U. S. Average—15 years old; 10th grade, Eastern High School, Baltimore, Md. (H.M.)

Ann Van de Putte—Iron Bacteria—16 years old; 11th grade, Northwestern High School, Hyattsville, Md. (Second Place Award)

MASSACHUSETTS

Janet Annaian—Can Chromatic Effects Be Induced in the Floral Envelopes of the Narcissus?—15 years old; 10th grade, Watertown Senior High School, Watertown, Mass.

Stephen Buchanan—Can Chicken Farming Be Controlled Electronically?—15 years old; 10th grade, Watertown High School, Watertown, Mass. (Second Place Award)

Frederick Johnson — Titanium — 15 years old; 9th grade, Weston High School, Weston, Mass. (Second Place Award)

David Donaldson—Tesla Coil—9th grade, Weston High School, Weston, Mass. (H.M.)

Louis Schell — Penicillin — 14 years old; 9th grade, John Wingate Weeks Junior High School, Newton Center, Mass. (H.M.)

Thomas Brewer — What Different Types of Lenses do to Light Rays—14 years old; 9th grade, John Wingate Weeks Junior High School, Newton Center, Mass. (H.M.)

Albert Momenthy—Boron—The Element of the Future—17 years old; 12th grade, Roslindale High School, Roslindale, Mass.

Llewellyn Bigelow — Non-Poisonous Gold Plating—16 years old; 12th grade, Weston High School, Weston, Mass. (Third Place Award)

Richard Cushmon — How Does the Electronic Organ Work?—16 years old; 10th grade, Watertown Senior High School, Watertown, Mass. (H.M.)

Richard Morse—Telescope—Observatory Project—17 years old; 12th grade, Phillips Academy, Andover, Mass. (H.M.)

MICHIGAN

Raymond Blake—Tesla Transformer—15 years old; 10th grade, Highland Park High School, Highland Park, Mich. (H.M.)

NEBRASKA

Leroy Krzycki—The Design, Construction and Operation of a Liquid Fuel Rocket Motor—16 years old; 11th grade, Columbus High School, Columbus, Neb. (Second Place Award)

NEW HAMPSHIRE

R. Bruce King—Preparation of Transition Element Compounds—15 years old; 10th grade, Spaulding High School, Rochester, N. H. (Second Place Award)

Donna Cartner—Hamster, Experimental Animal—16 years old; 10th grade, Keene High School, Keene, N. H. (H.M.)

Alan Novins—Relayless Electronic Calculator — 15 years old; 10th grade, Spaulding High School, Rochester, N. H. (H.M.)

Smiley Chase—Lighting the Way for Physics—16 years old; 11th grade, Keene High School, Keene, N. H. (H.M.)

NEW JERSEY

Rimantas Glemza—Effects of Tannic Acid on Iron—16 years old; 12th grade, St. John's Cathedral High School, Paterson, N. J. (H.M.)

Donald McNaboe—Proper Methods of Riveting Aluminum to Prevent Electrolytic Corrosion—16 years old; 11th grade, St. John's Cathedral High School, Paterson, N. J. (H.M.)

NEW MEXICO

Robert Ronzio—Crystals and Their Uses—14 years old, 9th grade, Los Alamos High School, Los Alamos, N. Mex.

NEW YORK

Paul Brest—Synthesis of Ammonia—12 years old, 7th grade, Riverdale Country School, Riverdale, N. Y.

Rolfe Ferrara — Electric Eye — 13 years old; 8th grade, Canastota Central School, Canastota, N. Y.

Muriel Guy—Narcotics and Stimulants—14 years old, 8th grade, Canastota Central School, Canastota, N. Y.

William Retz—The Making of Rayon Fibers—12 years old; 7th grade, Tappan Grammar School, Tappan, N. Y. (H.M.)

Robert P. Bogdal—Corrosion of Metals—14 years old; 9th grade, Grant Junior High School, Syracuse, N. Y.

John Buck—The Spectrum and the Green Plant—15 years old; 10th grade, Kenmore Senior High School, Kenmore, N. Y. (Second Place Award)

Richard Epard—The Effects of Water Soluble Chlorophyll on White Rats—15 years old; 10th grade, Bronx High School of Science, Bronx, N. Y. (Second Place Award)

Richard Chappell—The Use of Homemade Weather Instruments — 14 years old; 9th grade, Amherst Central High School, Snyder, N. Y. (H.M.)

Harry Rudloe — A Multi-Purpose Phototube Relay—15 years old; 10th grade, Erasmus Hall High School, Brooklyn, N. Y. (H.M.)

Frank Witebsky—The Area Occupied by a Molecule—14 years old; 9th grade, Nichols School, Buffalo, N. Y. (H.M.)

Robert Moss—Overcrowding Fish—15 years old; 10th grade, Abraham Lincoln High School, Brooklyn, N. Y. (H.M.)

Robert McIntosh — Nuclear Radiations—14 years old; 9th grade, Post Road Junior High School, White Plains, N. Y. (H.M.)

Edward Houghton—Life Cycle of Honey Bee Embedded in Plastic—14 years old; 9th grade, St. John's Atonement Seminary, Montour Falls, N. Y. (H.M.)

Michael Fried—Effects of Ordinary and Ultraviolet Light on Buckwheat-Fed Tribolium Confusm — 14 years old; 10th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

Martin Glass—Ability of Micro-Nutrients in Producing the Cyclopean Effect in Gastropods—15 years old; 10th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

Fred Roffe—Combination Intercom and Transceiver—14 years old; 9th grade; Wilson Junior High School, Mount Vernon, N. Y. (H.M.)

Mark Levine—Do Amino Acids and Sucrose Sprays Affect Dwarf Marigolds?—16 years old; 10th grade, Abraham Lincoln High School, Brooklyn, N. Y. (H.M.)

Bruce Block—Preparation Skeleton of Canis Familiaris—15 years old; 10th grade, Nichols School, Buffalo, N. Y. (H.M.)

Melvin Kalish—Advantages of Hydroponics—15 years old; 10th grade, Port Richmond High School, Staten Island, N. Y. (H.M.)

Darvin DeMarchi — The Dissectable Model of the Human Eyeball—14 years old; 10th grade, Nichols School, Buffalo, N. Y. (H.M.)

Stuart Young—Effects of Antiseptics and Disinfectants on Mold—15 years old; 10th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

Edward Hochstein—My Useful Incubator—15 years old; 10th grade, Bronx High School of Science, Bronx, N. Y. (H.M.)

Lawrence Harris—Cigar-Box Tesla Coil—15 years old; 9th grade, Town of Webb Schools, Old Forge, N. Y. (H.M.)

Gerald Horn—Men and Molds—15 years old; 10th grade, Kenmore Senior High School, Kenmore, N. Y. (H.M.)

Worcester's Educational Committee

Members of the 1952-53 Educational Committee of the Worcester Chapter Included, From Left, Standing: Walter B. Dennen, Director, Worcester Boys Trade High School; Nicholas P. Wakeen, Norton Co.; Lester M. Stern, North American Mfg. Co.; Albert B. Lyman, Arter Grinding Machine Co.; Eric H. Smith, Riley Stoker Corp.; and Robert S. Morrow, George F. Blake, Inc. Seated, from left, are: Lincoln G. Shaw, Pratt & Inman, secretary-treasurer; Harold J. Elmendorf, American Steel & Wire Division, U. S. Steel Corp., chapter chairman; and Joseph C. Danec, Norton Behr-Manning Overseas, Inc., educational committee chairman. (Photograph by C. W. Russell)

To Attend Hardness Testing Symposium in England

Vincent E. Lysaght, sales manager, Wilson Mechanical Instrument Division of American Chain & Cable Co., Inc., has recently left on an extensive European trip during which he will attend a "Hardness Testing Symposium" in Sheffield, England. Mr. Lysaght, author of the book "Indentation Hardness Testing", will present a paper on "Hardness Testing of Sheet Metal." He will also visit Belgium, Holland, Germany, Switzerland, Italy and France.

Holden Elects Officers

The A. F. Holden Co., New Haven, Conn., metallurgical engineers, has recently announced the election of the following officers: A. F. Holden, president and treasurer; John B. Carey, vice-president in charge of research and manufacturing at the Detroit plant; Calvin R. Brown, vice-president in charge of the New Haven Division and New England sales; and John R. Thim, secretary.

The A. F. Holden Co., manufacturers of salt baths and pot furnaces for the heat treatment of metals, was founded in New Haven in 1933 and now has plants in New Haven, Detroit and Milford, Mich., and in May of this year opened a plant in Los Angeles, Calif.

James E. Walker—Effects of Vitamins G (B_2) and D Deficiencies in Albino Rats—15 years old; 10th grade, St. John's Atonement Seminary, Montour Falls, N. Y. (H.M.)

Gary Luhman — Photoperiodism—14 years old; 9th grade, Kenmore Junior High School, Kenmore, N. Y. (H.M.)

John Filipsack, Jr.—Snails and Snail Eggs—14 years old; 9th grade, St. Patrick's High School, Syracuse, N. Y. (H.M.)

John Miller—Checking Variations in Commercial Power Frequencies—14 years old; 9th grade, Emmet Belknap Junior High School, Lockport, N. Y. (H.M.)

Paul Newcomb—Construction of a Model Wind Tunnel—14 years old; 9th grade, Amherst Central High School, Snyder, N. Y. (H.M.)

Mary Lou Seitz—Bacteria on Hands —15 years old; 10th grade, Our Lady of Mercy High School, Rochester, N. Y. (H.M.)

Bernice Ide — Determining Isotonic Concentration of Cells—15 years old; 10th grade, Newton High School, Elmhurst, N. Y. (H.M.)

Deborah Weissman—Resistance to Unfavorable Environmental Conditions in the Radish Seed—14 years old; 10th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

William Powell—The Reflex Arc—15 years old; 10th grade, Amherst Central High School, Snyder, N. Y. (H.M.)

Mary E. Schepp—Heredity in Bacteria—15 years old; 10th grade, Canastota Central School, Canastota, N. Y. (H.M.)

John C. Broderson—Electromagnets —14 years old; 9th grade, Grant Junior High School, Syracuse, N. Y. (H.M.)

Robert Tucker—Variations in Family Traits Through Heredity—15 years old; 10th grade, Newton High School, Elmhurst, N. Y. (H.M.)

Margot Dessauer—The Action of Soap, Detergents and Softeners in Water—Our Lady of Mercy High School, Rochester, N. Y. (H.M.)

Peter Pastreich—The Effects of 4-Amino-Pteroylglutamic Acid on Rats—14 years old; 10th grade, Abraham Lincoln High School, Brooklyn, N. Y. (H.M.)

John Bartholomew—Plant Hormones —14 years old; 9th grade, Canastota Central School, Canastota, N. Y. (H.M.)

Robert Rubinstein—Organometallosilanes and Organopolysilanes—15 years old; 12th grade, Lafayette High School, Brooklyn, N. Y.

Richard Stillman—Application of the Methods of Solid Analytic Geometry to Chrystallographic Measurement—15 years old; 11th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

Albert Nagler—Design and Construction of an 8-In. Telescope—18 years old; 12th grade, Bronx High School of Science, Bronx, N. Y. (H.M.)

James Vaughan—The Preparation and Use of Xerographic Plates—18 years old; 12th grade, Kenmore Senior High School, Kenmore, N. Y. (H.M.)

John Carmichael—A Study of Autoradiography—18 years old; 12th grade, Kenmore Senior High School, Kenmore, N. Y. (H.M.)

Mathias Coburn—Comparing Wear Resistance of Metals by Electricity —16 years old; 12th grade, Brooklyn Technical High School, Brooklyn, N. Y. (H.M.)

Louis Gorman—The Cyclotron—17 years old; Theodore Roosevelt High School, Fordham, N. Y.

Stephen Hirsch—Corrosive Effects of Gases on Nickel—16 years old; 11th grade, Bronx High School of Science, Bronx, N. Y. (H. M.)

Edgar Storms — The Relationships Between the Binding Forces of Molecules of Elements and Their Electronic Structures — 17 years old; 12th grade, James Monroe High School, Bronx, N. Y. (H.M.)

William Palmer—The Construction of a Reflecting Telescope—16 years

Progress Report on Fulmer Research Institute

Opened by Sir Stafford Cripps on July 2, 1947, the Fulmer Research Institute in Stoke Poges, Buckinghamshire, England, has now been operating for five years—long enough to assess performance and potentialities. Under its chairman, the late W. C. Devereux, by whose initiative the Institute was founded, it has grown steadily. Its yearly income has nearly trebled in the first five years, and the staff more than doubled.

Eighty-eight patents, both at home and abroad, have been applied for, and in many cases already granted on behalf of sponsors, who now number over 200. Twenty-five scientific papers have been published by different societies. Although a high proportion of the Institute's work has been for government departments, there has been a satisfactory and steady growth of industrial sponsorship from both home and overseas. The Institute was founded primarily as a service to British industry, and it is to that source that the Institute looks for the major increase in future sponsorship.

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old; 11th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

Kenneth Wasserman — Construction of Electronic 'Strobe' Light—16 years old; 11th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

Robert Kandel—Design of a Space Station—15 years old; 11th grade, Bronx High School of Science, Bronx, N. Y. (H.M.)

William Smith—Fluorochemical Experimentation—16 years old; 12th grade, Catholic Central High School, Troy, N. Y. (H.M.)

Arthur Pearlmutter—Meteorics: A Revised Statistical Analysis — 16 years old; 12th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

Carl Margolis—Purifying Metals by Decomposing Their Iodides—16 years old; 11th grade, Erasmus Hall High School, Brooklyn, N. Y. (H.M.)

Edward Gray — Experiments With Crystals Including a Conductivity Experiment With Gypsum — 15 years old; 11th grade, Forest Hills High School, Forest Hills, N. Y. (H.M.)

Joseph R. Marcus—Photoelasticity and the Engineer—17 years old; 12th grade, Kenmore Senior High School, Kenmore, N. Y. (H.M.)

Nancy Rochkind—Uses of Paper Chromatography and Its Relationship to the Qualitative Analysis of Metallic Ions—16 years old; 12th grade, James Monroe High School, Bronx, N. Y. (H.M.)

Norman G. Schaaf—The Theory and Application of Ion Exchange—17 years old; 11th grade, Cleveland Hill High School, Cheektowaga, N. Y. (H.M.)

John Gillespie — De-Mineralizing Water by Ion Exchange—16 years old; 11th grade, Kenmore High School, Kenmore, N. Y. (H.M.)

OHIO

Roger Stiller—Reflective Contours—13 years old; 8th grade, Roxboro Junior High School, Cleveland Heights, Ohio (H.M.)

Arthur Dunkle—A Statistical Study of Manganese Analysis in B 1111 Steel—14 years old; 9th grade, Boardman High School, Youngstown, Ohio.

Ronald Tarris — Reproduction — 15 years old; 10th grade, York Centralized, Clyde, Ohio (H.M.)

Daniel Shannon—Resistivity of Gases at Low Temperatures—17 years old; 12th grade, St. Xavier High School, Cincinnati, Ohio (Third Place Award)

Roger Barry—Mirror Research—17 years old; 12th grade, Withrow High School, Cincinnati, Ohio (H.M)

OKLAHOMA

Beverly Webb and Myrna Kidd — Lack of Vitamin C in Guinea Pigs —14 and 15 years old; 9th grade, Norman Junior High School, Norman, Okla. (Second Place Award)

Mike Bross and Lynn Murrell—Principles of Television—15 and 14 years old; 9th grade, Norman Junior High School, Norman, Okla. (Second Place Award)

Anne Stovall—Lapidary Project—15 years old; 9th grade, Norman Junior High School, Norman, Okla. (Second Place Award)

Kay Lee—A Study and Classification of the Plant and Animal Kingdom—15 years old; 10th grade, Norman Junior High School, Norman, Okla. (H.M.)

Buster Wilburn—Drilling With Diamond Bits and Core Barrels—14 years old; 9th grade, Norman Junior High School, Norman, Okla. (H.M.)

OREGON

Stanley Lee—Reproduction of Early Microscopes—17 years old; 10th grade, Salem Senior High School, Salem, Ore.

Ann Lowery—Enemies of Oregon Industries and Their Control—15 years old; 10th grade, Salem Senior High School, Salem, Ore. (Second Place Award)

Rosemary Gilbert—How to Use a Key to Identify Winter Twigs—15 years old; 10th grade, Salem Senior High School, Salem, Ore. (H.M.)

Wayne Yunker — Anodizing Aluminum—17 years old; 12th grade, Corvallis High School, Corvallis, Ore.

PENNSYLVANIA

Bette-Lee Jarvis—Study of the Eye—12 years old; 8th grade, Bala Cynwyd Junior High School, Bala Cynwyd, Pa.

Hans Toffer — Energy From the Tides—16 years old; 10th grade, Allentown High School, Allentown, Pa.

Frederick Greenleaf, Jr.—Silicon Organics—15 years old; 10th grade, Allentown High School, Allentown, Pa. (Second Place Award)

Ted Baffa—Hydroponics—14 years old; 9th grade, Bala Cynwyd Junior High School, Bala Cynwyd, Pa. (H.M.)

Carl Johnson — Chromatography—15 years old; 10th grade, Allentown High School, Allentown, Pa. (H.M.)

Susanne Mehaffie—Corrosive Properties of Altoona City Water — 16 years old; 11th grade, Altoona Senior High School, Altoona, Pa. (Second Place Award)

Ted Litzenberger—Pulse Jet Engines—17 years old; 12th grade, Allentown High School, Allentown, Pa. (Third Place Award)

James Smeal — Modern Electroplating—16 years old; 11th grade, Altoona Senior High School, Altoona, Pa. (H.M.)

Elizabeth Brown — Aluminum — Its Isolation and Its Compounds—17 years old; 11th grade, Altoona Senior High School, Altoona, Pa. (H.M.)

Stephen Bird—Space Heating by Solar Radiation—18 years old; 12th grade, Allentown High School, Allentown, Pa. (H.M.)

Richard Steyert—Collection of the Elements — 16 years old; 11th grade, Allentown High School, Allentown, Pa. (H.M.)

RHODE ISLAND

David Berube—Manufacture of Metal Powders by Electrolysis — 17 years old; 11th grade, Nelson W. Aldrich High School, Lakewood, R. I.

TENNESSEE

Jennifer Tipton — Tracking Down Alpha Particles—15 years old; 11th grade, Central High School, Fountain City, Tenn. (HM.)

TEXAS

Arthur Chester — Formulas and Tables for Regular Polygons—12 years old; 8th grade, Baker Junior High School, Austin, Tex.

Eleanor Millar—The Effect of Water Soluble Chlorophyll on the Regeneration and Survival Rate of Planaria—14 years old; 10th grade, Stephen F. Austin High School, Austin, Tex.

Virgil Barnes—An Investigation of Selected Radioactive Ores Using Thick-Emulsion Photography — 17 years old; 12th grade, Austin High School, Austin, Tex.

Thomas Manuel—The Separation of Group II Cations by Ion Exchange Resins—17 years old; 12th grade, Austin High School, Austin, Tex. (Second Place Award)

UTAH

Gordon Steffen—Crystal Radio—13 years old; 8th grade, Logan Junior High School, Logan, Utah (H.M.)

VIRGINIA

James Hayes—Use of Calculus in Solving a Civic Problem—16 years old; 12th grade, Booker T. Washington High School, Norfolk, Va.

Jane Black—Four Inert Minerals From the Potomac Sediments—16 years old; 11th grade, James Monroe High School, Fredericksburg, Va. (Second Place Award)

WASHINGTON

Phillip Webber—Amateur Photography Unit—14 years old; 8th grade, Hamilton Junior High School, Seattle, Wash. (H.M.)

William Marshall—Modernization of Diesel—13 years old; 8th grade, Hamilton Junior High School, Seattle, Wash. (H.M.)

Sidney Handlin and John Kulander—The Effect That Penicillin Has on the Sprouting and Growing of Seeds—14 years old; 9th grade, Edmond S. Meany Junior High School, Seattle, Wash.

Robert Dycus—The Ecliptic System of the Celestial Sphere—16 years old; 10th grade, Lewis and Clark High School, Spokane, Wash. (Second Place Award)

William Schonbein—High Vacuum Unit—14 years old; 9th grade, Hamilton Junior High School, Seattle, Wash. (H.M.)

John Goodman—Photo-Electric Cell—13 years old; 9th grade, Hamilton Junior High School, Seattle, Wash. (H.M.)

Richard Erickson—Photosynthesis—15 years old; 10th grade, Lincoln High School, Seattle, Wash. (H.M.)

Rodney Whitefield—The Reduction of Silicon by the Formation and Thermal Decompositon of Silicon Hydrides—17 years old; 12th grade, Lewis and Clark High School, Spokane, Wash. (Third Place Award)

WISCONSIN

Richard Reznichek—Seed Germination Box—13 years old; 8th grade, Wisconsin High School, Madison, Wis. (H.M.)

Gene Uehling—Construction of My Television Set—16 years old; 10th grade, Aquinas High School, La Crosse, Wis. (Second Place Award)

Donald Dezek — Electric Eye — 17 years old; 11th grade, Mary D. Bradford High School, Kenosha, Wis.

Arthur Cook—Studies in Chromatography—16 years old; 11th grade, Aquinas High School, La Crosse, Wis. (Third Place Award)

PUERTO RICO

Angelina Cordova—In a Land of Hillside Farming—15 years old; 10th grade, Colegio Espiritu Santo, Floral Park, Hato Rey, P. R. (Second Place Award)

Michigan Expedition Locates Ancient Mines

Roy W. Drier, professor of metallurgy at Michigan College of Mining and Technology, led an expedition to Isle Royale national park, Mich., this past summer. The party's excavations revealed wooden tools in the island's ancient mine pits believed to be over 3000 years old. Researchers also uncovered stone mauls which the prehistoric miners used to break copper-bearing rocks, and chunks of charcoal from fires where larger rocks were heated so the miners could break them by dousing them with water.

The researchers, under Dr. Drier's leadership, are attempting to discover who the prehistoric miners were and more about when and how they mined, and how they transported the metal. Two more trips to the ancient mines are planned before winter.

Receives Petroleum Gas Association Award

Ellsworth L. Mills, Vice-President, Bastian-Blessing Co., Chicago, Received the Distinguished Service Award of the Liquefied Petroleum Gas Association at its Annual Convention in Chicago. From left are: M. L. Trotter, Columbia, S. C., new L.P.G.A. president; Mr. Mills; J. Woodward Martin, Amarillo, Tex., a past president, who made the presentation; and F. N. Mabee, Denver, Colo., retiring president. Upwards of 3000 attended the convention. (Photograph by Allison Lighthall, Chicago)

Hot Extrusion of Metals Topic of Columbus Talk

Reported by Andrew N. Eshman

Engineering Laboratory
North American Aviation, Inc.

"Hot Extrusion of Metals, Particularly Steel", was discussed at a meeting of the Columbus Chapter by Jerome Strauss, vice-president and technical director, Vanadium Corp. of America.

Hot extrusion of steel was first attempted by the French in the mid-30's. During the initial experimentation it was apparent that die life was the critical factor. The hot steel billets had to be prevented from contacting the die surface. After various lubricants were tried with little success, glass was tried and proved to be satisfactory. Glass possesses the properties required to provide protection for the die surface, slow and adequate melting, a melting range rather than point, the right viscosity and uniform flow.

Horizontal hydraulic presses with movable containers are used for the hot extrusion of steel. The billets are skin machined, preheated to 1600° F. in a gas-fired furnace, then soaked for 10-15 min. in a salt bath at 2100-2300° F. The billet is then transported to the extrusion press. If the material to be extruded is stainless steel, it is rolled in glass on the way—if carbon steel, spun glass is inserted in the die.

After extruding the material through the die, most of the glass adhering to the surface is removed during quenching. Any remaining glass is eliminated by a short hydrofluoric acid pickle. The average glass thickness on the extrusion is approximately 2-5 microns.

More than 1500 odd shapes and sections have been extruded. Costwise, a hot steel extrusion is dependent upon the tolerances required. As the die wears, the dimensional accuracy of the extrusion decreases, necessitating die replacement. Although the dies are relatively inexpensive, their life is limited to approximately 15-50 operations.

Southern Chapters Hold Annual Regional Meeting

Reported by James M. Edge

Tennessee Coal & Iron Division
U. S. Steel Corp.

The Regional Meeting of the Atlanta, Birmingham, Chattanooga, New Orleans, and Oak Ridge Chapters of the American Society for Metals was held at the Thomas Jefferson Hotel in Birmingham this year. The technical session included the following speakers.

W. D. Manly, metallurgical division, Oak Ridge National Laboratories, spoke on "Developments in High Alloys for Heat and Corrosion Resistance".

C. K. Donoho, chief metallurgist, American Cast Iron Pipe Co., discussed "Recent Developments in the Casting of Metals".

R. F. Frings, Ray F. Frings Co., manufacturing distributors, gave a talk on "Modern Methods and Techniques in Oxide Removal From Metal Surfaces".

James E. LeCroy, supervisor of metallurgy, Wire Works, TCI Division, U. S. Steel Corp., talked on "Manufacture of Wire and Wire Products".

W. H. Eisenman, A.S.M. national secretary, guest after-dinner speaker, presented a talk on "The A.S.M. Looks at Europe".

Navy to Revise Foundry Manual

The Bureau of Ships of the Department of the Navy has announced that a contract has been awarded for the revision of the Bureau's "Foundry Manual". This revision will include developments and improvements in foundry technology which have come about since preparation of the present manual. The purpose of the manual is to provide training instruction and ready reference material to naval personnel engaged in foundry work on board repair ships and tenders and at shipyards and advance bases. Publication is expected in the spring of 1954.

Celebrates 75th Birthday

David Ford McFarland, long-time head of the metallurgy department at the Pennsylvania State College, celebrated his 75th birthday on Aug. 1 by quietly enjoying the greetings, both written and personally delivered, of his many former students and other friends.

Some men become famous as teachers, whereas others are notable

for their researches. Dr. McFarland earned fame in both categories. On the one hand, as co-discoverer of helium in natural gas, he made a research contribution of far-reaching significance; on the other, as a teacher, he can be proud of the hundreds of men who received their baccalaureate degrees under his tutelage, and of some of the illustrious scientists who were his graduate students.

Still a loyal supporter of A.S.M. he has been a member of the Society or one of its precursors since 1920.

Covers Salt Bath Furnace and Its Uses at Cincinnati

Reported by Gregory F. Baumann
Superintendant of Tool and Die Gruen Watch Co.

L. B. Rosseau, vice-president of the Ajax Electric Co., Inc., discussed "Salt Bath Furnaces and Their Applications" at the September meeting of the Cincinnati Chapter. He explained uses of salt baths for heat treating, and, surprisingly enough, the cooling of work by immersing it in a liquid bath in the furnace.

The application of salt bath furnaces for industrial requirements is quite new, the first commercial installation of any importance in this country having been made less than 25 years ago, and that being limited to the heat treatment of high speed steel and the annealing of cold drawn wire products. Since that time growth has been rapid—in this country alone there are approximately 4000 such furnaces, ranging in sizes up to 40 ft. long, 20 ft. deep, and 8 ft. wide. Many are operating with a constant load of 1000 or more kw., some over 2000 kw.

Mr. Rosseau showed illustrations of new designs of salt bath furnaces and explained the basic characteristic of each, since each characteristic has an important effect on the success of this type equipment and must be clearly understood.

Heating by conduction makes the salt bath furnace a high-production unit. The time required to heat a specimen is approximately 5 min. per in. of thickness, just ¼ the time required in an atmosphere furnace. It avoids the major headaches of handling metals at high temperature—scaling and decarburization—without extra equipment, added expense or skilled personnel. Distortion due to heat treatment is held to a bare minimum. So, making plain the process by which each of these effects exist, Mr. Rosseau proved the simplicity, economy, time and space-saving features of this type equipment.

He covered the furnace construction features, stressing the diversity of sizes and shapes, the superior efficiency of each for the particular jobs required, and the therefore economical aspect of salt bath furnaces. Salf quenching was compared with oil quenching and numerous advantages of the former pointed out. Mr. Rosseau also showed slides and discussed the built-in automatic salt purifying system of the quench furnace, the jack rabbit mechanism, push-pull mechanism, merry-go-round type mechanism, and overhead screw conveyor. Slides on elevator type and rotary basket type furnaces were shown without comment.

In discussing the applications of the salt bath furnace, Mr. Rosseau covered neutral hardening, high-speed steel tool hardening, cyanidine, carburizing, interrupted quenching treatment, annealing, solution heat treatment, descaling and desanding, brazing and heating for forging, and indicating that this type of equipment is one of the outstanding new applications of electrical energy to industry.

Compliments

To HUGH FORD BEEGHLY, head of the applied science section, Division of Metallurgical Research, Jones and Laughlin Steel Corp., on his recent election to chairman of the Pittsburgh Section of the American Chemical Society.

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To WILLIAM E. MAHIN on his appointment as technical director of Vanadium Corp. of America. Mr. Mahin was formerly director of research for the Armour Research Foundation. He will direct the technical and research activities of Vanadium Corp. which is erecting a $1,000,000 research center in Cambridge, Ohio, where it operates a new aluminum and ferro-alloy producing plant. Mr. Mahin received his B.S. degree from University of Notre Dame in 1928, and his M.S. degree from Carnegie Institute of Technology in 1933. He has served as a consultant on titanium to the Minerals and Metals Advisory Board of the National Research Council since 1950, and as consultant to the ship steels committee of the National Academy of Science since early this year. He was chairman of the Chicago Chapter A.S.M. in 1950-51. Mr. Mahin is the son of Professor E. G. Mahin, founder and for many years head of the metallurgy department at the University of Notre Dame.

♦ ♦ ♦

To SAM TOUR on his election as president of the Metal Science Club of New York. He is manager of Sam Tour and Co., New York, industrial consulting, research and testing organization. HOWARD S. AVERY of American Brakeshoe Co. was named vice-president, and JOHN P. NIELSON, professor of metallurgy at New York University was elected secretary-treasurer. The club's membership is made up of executives in science and industry with ten or more years creative experience in metals technology.

♦ ♦ ♦

To HOWARD S. GRIFFIN of Toronto who has been appointed Canadian sales representative of the American Nickeloid Co.

Schedule Conference On Atomic Energy

The second annual conference on "Atomic Energy in Industry" sponsored by the National Industrial Conference Board, Inc., will be held in New York at the Waldorf-Astoria Hotel on Oct. 29-30, 1953. Prominent speakers from the Atomic Energy Commission and from private industries engaged in atomic energy research will present a series of lectures on the following subjects: "Changing the Atomic Energy Act—Pro and Con"; "Reactor Design and Technical Development in New Metals and Coolants"; "Developing Commercial Atomic Power"; "Cutting Costs Through Use of Radioisotopes"; "Possible Economic Impact of Atomic Energy"; and "Improving Product Quality With Use of Radioisotopes".

Models of reactors will be displayed during the conference, and a trip (open to U. S. citizens only) will be made to the Brookhaven Atomic Installation the day preceding the opening of the conference.

At a special luncheon session on Oct. 30, Sir Christopher Hinton, deputy controller, Atomic Energy (Production), Ministry of Supply, Great Britain, will discuss "Atomic Power Developments Abroad". This will be the first time Sir Christopher has discussed the British program in this country.

New York Chapter Lists Educational Opportunities

The New York Chapter, in conjunction with the New Jersey Chapter A.S.M., has compiled a listing of metallurgical education courses offered in the New York Metropolitan area for 1953-54. Institutions listed are Brooklyn Polytechnic Institute, Columbia University, New York University and Stevens Institute of Technology. The folder lists all courses and degrees offered, credit points, instructors, and information relative to registration and admission of students. A copy of this listing may be obtained by writing to John P. Nielsen, chairman, Education Committee, New York Chapter A.S.M., New York University.

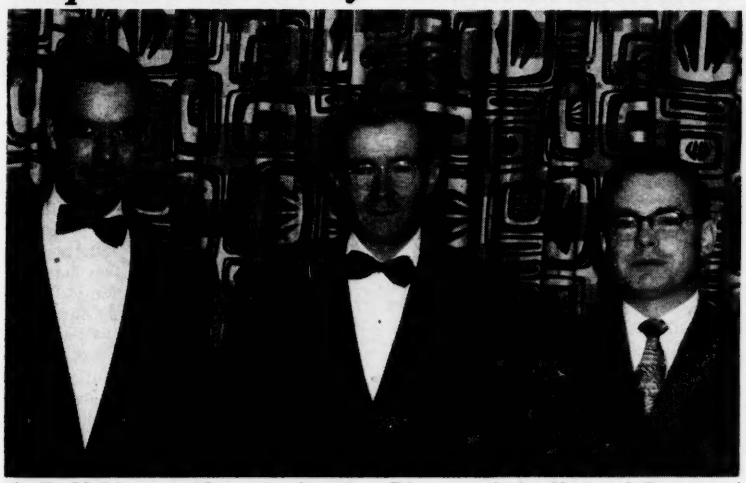
A high-school educational course on "Metallurgy—Today and Tomorrow" will be given by the New York Chapter early in 1954. The series consists of five lectures and will be held at Bronx High School of Science, Bronx, N. Y.

A four-lecture course on "The Principles and Significance of Some Basic Metallurgical Tools" is being given for industrial personnel by the New York Chapter at Brooklyn Technical High School commencing Oct. 13. Lectures will be given on "Mechanical Testing", "Nondestructive Testing for Defects", Metallography", and "Pyrometry".

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Boston	Nov. 6	Hotel Shelton	John C. Fischer	Fractures
Buffalo	Nov. 12	Hotel Sheraton	J. B. Austin	National Officers Night
Calumet	Nov. 10	Phil Smidt's	T. W. Lippert	Manufacturing and Fabricating Titanium
Canton-Massillon	Nov. 8	Mergus Restaurant	C. L. Clark	Special Steel Developments
Carolinas	Nov. 19	Poinsette Hotel, Greenville, S. C.	A. N. Kugler	General Welding
Cincinnati	Nov. 12	Eng. Soc. Hdqrs.	H. B. Knowlton	Selection of Steel for Performance
Cleveland	Nov. 2	Hollenden Hotel	J. B. Austin	National Officers Night
Columbus	Nov. 12	Senaca Hotel		All-Council Meeting
Dayton	Nov. 11	Engineers' Club	E. C. Bain	History of Iron and Steel Industry
Ft. Wayne	Nov.		G. A. Roberts	National Officers Night
Georgia	Nov. 8	Georgia Tech	C. McLendon	Present Industrial Development of the South
Hartford	Nov. 10	The Hedges	G. Comstock	Powder Metallurgy and Cemented Carbides
Indianapolis	Nov. 16	McClarney's Restaurant	R. L. Wilson	Properties and Applications of Some Engineering Alloys
Jacksonville	Nov. 16	Seminole Hotel		Copper-Base Castings and Foundry Problems
Kansas City	Nov. 18	Pine Room, Fred Harvey's	Walter Jominy	Hardenability Measurements
Los Alamos	Nov. 23		S. A. Herres	
Louisville	Nov. 10	L and N Branch Y.M.C.A.	Tex Klaybov	Toolsteels and Their Applications
Mahoning Valley	Nov. 10	V.F.W.	Manuel Tama	Induction Melting of Nonferrous Metals
Milwaukee	Nov. 17	City Club	E. J. Krabacher	Research and Methods of Machining Metals
Minnesota	Nov. 19	Covered Wagon	L. D. Jaffe	Temper Brittleness
Montreal	Nov. 2		R. K. Linagh	Metals on a Railroad
New Haven	Nov. 19	Hotel Elton, Waterbury	Frederick Hanson	Metallurgy of Ductile and Gray Iron
New Jersey	Nov. 16	Essex House	F. H. LaQue	Corrosion in Action—Film
New Orleans	Nov. 4		E. N. Skinner	Alloys for Elevated Temperature Service
New York	Nov. 9		J. R. Dunning	Outlook for Industrial Atomic Power
Notre Dame	Nov. 11	Engineering Bldg.	W. H. Splinter	Machinability of Metals
Northwestern Pennsylvania	Nov. 19	Titusville	G. I. Clark	Clad Metals
Ontario	Nov. 6	Royal Hotel, Toronto	R. F. Thompson	Role of Metallurgy in Boosting Production and Reducing Costs
Oregon	Nov. 20		F. G. Tatnall	Research and Design
Ottawa Valley	Nov. 3	Phy. Met. Res. Lab.	B. H. Alexander	Metallurgical Aspects of Transistor Development
Philadelphia	Nov. 27	Engineers' Club	J. B. Austin	National Officers Night
Philadelphia-Junior Group	Nov. 13	Midvale Co.	G. Hood	Plant Visit
Pittsburgh	Nov. 12	Fort Pitt Hotel	Panel	New Methods of Hot Forming Metals
Rochester	Nov. 9	Chamber of Commerce	L. P. Tarasov	Metallurgical Aspects of Grinding
Springfield	Nov. 16	University of Massachusetts	W. C. Troy	Role of Residual Stresses in Component Development
St. Louis	Nov. 20	Forest Park Hotel	Panel	Materials Problems
Syracuse	Nov. 10	Onandaga Hotel	John D. Dale	Powder Metallurgy Industry
Texas	Nov. 3	Ben Milam Hotel	F. G. Tatnall	Relation Between Engineering and Metallurgy
Tri-City	Nov. 8	Rock Island Arsenal	Weber deVore	Cold Extrusion Process
Washington	Nov. 9	Naylor's Restaurant	T. A. Pruger	Manganese—Key to Future Growth of Stainless Steels
Western Ontario	Nov. 13	Windsor	Walter Holcroft	Gas Carburizing
Wichita	Nov. 17	K. of C. Hall	George Fisher	Corrosion in Action
West Michigan	Nov. 16	Lock's Restaurant	T. C. DuMond	Engineering Materials
Worcester	Nov. 11	Hickory House	E. J. Pavesic	Heat Treat Night

Explains Bureau of Standards Research



A. T. McPherson (Center), Associate Director of the National Bureau of Standards, Discusses His Talk "Testing, Calibration and Research at the National Bureau of Standards" With Vice Chairman Donald Davis (Left), and Chairman Paul Lauletta (Right), at Ft. Wayne's First Meeting This Year

Reported by G. R. Hemmeter
General Electric Co.

A. T. McPherson, associate director of the National Bureau of Standards, spoke before the first meeting of the Ft. Wayne Chapter this season on "Testing, Calibration and Research at the National Bureau of Standards". He pointed out that the broad standardizing functions and related activities assigned to the Bureau by Congress have made it the principal federal agency for research in physics, chemistry, mathematics and engineering and related sciences.

To meet expanding needs of science and industry, old standards must be pushed to higher accuracy, and new standards for cobalt 60 and the radium-beryllium source of neutrons, for example, must be developed. The proposed international wavelength standard may make possible an increase in the precision of gages of one to two orders of magnitude. Industry is already asking for this added precision. Dr. McPherson pointed out that various pure substances are in the process of being measured for use as standards.

The Bureau develops methods of testing and conducts acceptance tests of products purchased by the Government. Standards of measurement and test methods developed are incorporated into codes and specifications through participation in the technical activities of more than 400 national standardizing organizations. The Bureau's research facilities are extensively employed to develop products for Government use, from guided missiles to polymer-impregnated sole leather, and paper made wholly from glass fibers.

Precision measuring techniques are applied to many general interest problems in collaboration with associations as well as government agencies. In cooperation with the American Dental Association, for example, standards have been set for making amalgams, plastic restorations, silicate cements, gold inlays, etc.

Results of the Bureau's work are presented to the public by motion picture films and publications.

Abrasive Company Expands

The Cleveland Metal Abrasive Co. has announced the formation of a new facility for the production of cut wire shot. This plant, located in Northfield, Ohio, will be known as the Cut Wire Division, and will result in expanded facilities which will double the production of this particular abrasive material.

Dayton to Offer Course on Alloying Elements in Steel

Reported by D. C. Heckard
Research Laboratories
Armco Steel Corp.

The Dayton Chapter has announced that it will offer an educational program this fall on "Alloying Elements in Steel". The course will be given by past-chairmen of the Chapter and has been designed to be presented in terms the layman can understand but with a thoroughness that will make the course valuable to metallurgists and metalworkers alike.

Registrants will be required to purchase the book "Alloying Elements in Steel" by E. C. Bain, for $4 and no other charge will be made for the course. Certificates will be presented to those who attend the series of five lectures.

In November, the Chapter will invite all those enrolled in the course to attend the regular monthly meeting when the author of the book E. C. Bain, vice-president of research and technology, U. S. Steel Corp., will present a lecture on the "History of the Iron and Steel Industry".

Lectures to be presented include: **Fundamental Characteristics in Steels,** by O. G. Saunders, chief metallurgist, Hobart Mfg. Co.; **Alloying Elements in Unhardened Steels,** by William McCrabb, manufacturers representative; **Effects of Alloying Elements in Forming Austenite,** by S. M. Depoy, superintendent, Dayton Forge & Heat Treat Co.; **Effects of the Elements in Hardening Steel,** by L. L. Jaffe, Frigidaire Division, General Motors Corp.; and **Effects of Alloying Elements in Tempering,** by S. R. Prance, chief metallurgist, Inland Mfg. Division, General Motors Corp.

Pittsburgh Enjoys Annual Golf Outing

Relaxing on the Porch of the Alcoma Golf Club Are Members and Guests of the Pittsburgh Chapter Who Attended the Annual Golf Outing. Robert K. McGeary, Westinghouse Atomic Laboratory, won the Aluminum Co.—A.S.M. Golf Trophy for the second year with a low score of 75. Other golf prizes went to H. B. Ecker whose drive was closest to the pin on hole 8, and L. Aguino, whose drive was closest on hole 17. P. J. Nicholas won the prize for the longest drive of the day, on his approach to hole 1

New Films

Tool and Die Making

Keystone of Mass Production

The National Tool and Die Manufacturers Association has released a 22-min., 16-mm. full color and sound movie "Tool and Die Making . . . Keystone of Mass Production". The film was produced in leading industrial plants and tool and die shops in the East and Middle West. It shows mass production techniques in manufacturing such diverse products as automobile crankshafts and zippers for clothing, and also features the craftsmanship in tool and die making upon which such production initially depends.

The film was produced for N.T.D. M.A. by Farrell & Gage Films, Inc., and prints are available through the association's national headquarters, 907 Public Square Bldg., Cleveland 13, Ohio.

Technique for Tomorrow

A new industrial revolution is the theme of the Ford Motor Co.'s latest motion picture—"Technique for Tomorrow". The film tells the story of an industrial community of tomorrow, a new foundry and engine plant built in Cleveland, Ohio. The film looks beyond the horizons of today and provides a glimpse of a new and challenging way of industrial life. The film reveals a new industrial science created in the 20th century, automation, where machines do the hard work to save men for better jobs.

The film, a 16-mm. black and white production, is available without charge to persons or organizations requesting it. Write to: Film Library, Ford Motor Co., 16400 Michigan Ave., Dearborn, Mich.

Forging in Closed Dies

A new film, Forging in Closed Dies, has been prepared by the Drop Forging Association for instruction and educational use. The film represents over 10 years of planning and research. Both narration and sequence are based in large part on suggestions from industry specialists and instructors of mechanical engineering and metallurgy. Participating were more than 80 colleges and universities. The film covers every phase and operation in the making of closed die forgings.

The film is available without charge to industry, training programs, colleges and universities, and technical societies. For further information, write to: Drop Forging Association, 605 Hanna Bldg., Cleveland 15, Ohio, attention Marvin Narramore, Film Distribution Director.

Scott Discusses the Brittle Fracture of Metals at Buffalo

Reported by A. E. Leach
Metallurgical Engineer
Bell Aircraft Corp.

Beware of brittle fracture in metals! Today's increasing demand for lighter, stronger metallic structures has brought about the use of metals at strength levels which often cause them to fail by fractures which show no ductility. Since their ability to be plastically deformed has always been one of the leading attributes of metals, much recent research has been devoted to the exploration of brittleness in metals and the factors which influence it.

Some of the work of the research laboratories, Westinghouse Electric Corp., East Pittsburgh, Pa., was covered for the Buffalo Chapter at their first meeting in a lecture entitled "Fracture of Metals" delivered by Howard Scott, manager, metallurgical and ceramic department.

Westinghouse has found the torsion test most useful for brittle fracture studies because it is less subject to ambiguous interpretation than the better known tensile test. Their approach to the problem has been to study fracture under conditions inducing brittleness, such as high hardness levels, etc. In these tests the ductility was so low that elastic stress distribution became very important.

Data was presented to show that, over a wide range of hardnesses in any given steel, there is a definite maximum in the fracture strength. Failures below this maximum (at lower hardnesses) were ductile, and those above, brittle. This is a clear warning to the metallurgist: he cannot go to higher hardness levels for greater strength without the risk of getting into the "brittle failure" zone.

Having established the existence of this maximum, Westinghouse has devoted its efforts to determine how it is affected by metallurgical and mechanical variables. Obviously, to move it to higher hardness levels is to allow the use of greater strengths in metal structures with reasonable assurance of plastic deformation before failure. Westinghouse has found that the "brittle fracture strength" is increased by grain refinement and cold work, unchanged by strain rate, and lowered by a grain boundry precipitate. Strain rate nevertheless is an important variable since it increases yield strength and thereby permits brittle fracture closer to room temperature than otherwise when determining transition temperatures.

The metallurgist is primarily interested in resistance to shear stresses and often is misled by the convention of expressing mechanical properties as yield strength and tensile strength. These are values used in design but they are not at all indicative of ductility. The design engineers' primary interest is in resistance to shear, a fact obscured by the common practice of expressing it as tensile yield and ultimate strength. In providing high values of these properties, the metallurgist assumes responsibility for avoiding brittle fracture and to do so he must distinguish clearly between shear and tension fracture. The key to the interpretation of ductilitity is in such observations.

The story of "brittle fracture" is still far from complete. The most intensive effort has been made on body-centered cubic metals since these are most commonly used in structures. Metals of other crystal habits are known to behave differently. Mr. Scott added that he did not have time to discuss fatigue, hydrogen embrittlement, and the high temperature metals, because each would be a worthy topic in itself.

Fitchburg Training Course For Vocational Instructors

At a Conference for Vocational School Teachers held recently at the Fitchburg (Mass.) State Teachers College, a course in "Metals Technology" was conducted for teachers of machine shop work and machine drafting. The instructor in charge of the course, Fred Werner of Massachusetts Institute of Technology faculty was provided through the Boston Chapter of the American Society for Metals.

The 34 members of the class were all very high in their praise of Mr. Werner's presentation of the course. The Department of Education of the Commonwealth of Massachusetts has planned to develop the knowledge of metals technology acquired by the instructors into a training course on the heat treatment of metals in the State's vocational schools in the near future.

G. E. to Add Laboratory

Radical advances in metals and related products are expected to be hastened by a new metallurgical development laboratory now being planned by the General Electric Co. The new facility, part of the company's multimillion dollar Research Laboratory at the Knolls in Schenectady, N. Y., will provide more than 70,000 sq. ft. of floor space. It will be the eighth building of those comprising the Research Laboratory.

The new structure will provide extensive facilities in which new metallurgical materials developed in the laboratory can be produced in sufficient quantities to enable them to be evaluated by operating components of the company. Equipment will include a cold rolling mill, an arc furnace, and other pieces of equipment for the experimental processing of metals and related materials.

Knowlton Tells of European Mission

Harry B. Knowlton (Left), Who Spoke at the Tri-City Chapter s First Meeting of the Season, Is Shown Shaking Hands With Walter W. Warner, Commandant of Rock Island Arsenal. Looking on is A. C. Hanson, director of the metallurgical laboratory at the Arsenal. Mr. Knowlton was in charge of the same laboratory at the Arsenal during World War I

Reported by George W. Baldwin

Methods Engineer
Minneapolis-Moline Co.

The Tri-City Chapter heard Harry B. Knowlton at its September meeting. Mr. Knowlton is in charge of the materials engineering department of International Harvester Co. in Chicago. He has been on a two-man mission which was sent to Europe this past year to consult with NATO country industrialists on the manufacture and uses of boron steel.

He gave a talk which covered the experiences with "Use and Testing of Boron Steel" at International Harvester Co., and showed color slides of the European trip.

Mr. Knowlton stressed the need for the free world to be ready with advanced knowledge of alloying elements. He stated that it was his belief that in the event of another war, the side which was able to make their supply of alloy steel go the farthest would win the struggle.

He explained that his own work with boron steel shows that this alloy is cheaper to make and is a perfectly satisfactory alloy when used in correct applications. International Harvester was a leader in development of the making and uses of boron steel, according to Mr. Knowlton. It found that the test of performance, which is the real test, was met 100% by heat treating grades of boron steels. No failures were encountered. Applications where boron steels would not meet the test of performance were determined and avoided. A considerable tonnage of boron carburizing steels has been used successfully for case hardened gears. Some users have reported considerable trouble with distortion when boron steels were used. The trend is away from these steels for case hardened gears.

The two-man mission to Europe, Mr. Knowlton reported, encountered a general lack of knowledge of boron steel on the part of the plants visited. Trial heats of this alloy steel were made during the visit of the Americans. Discussions of uses of alloys indicated that the Europeans have generally used larger proportions of alloy than has been the practice in this country. Mr. Knowlton hoped that this mission might help pave the way for closer cooperation between the technical men in Europe and America in the study of metallurgical problems.

Peoria Entertains Ladies

Reported by W. O. Kaarlela

Caterpillar Tractor Co.

The Peoria Chapter opened the 1953-54 season with its Seventh Annual Ladies Night. Members and their ladies enjoyed a fine dinner, followed by entertainment and a talk by G. Chapman Caldwell of Peoria, an authority on veteran affairs throughout the state of Illinois.

Indian Symposium

The National Metallurgical Laboratory, Jamshedpur, India, is planning a symposium on "Nonferrous Metal Industry in India" to be held in January 1954 at the Laboratory. The object of the symposium will be to focus attention on the present state of the Indian nonferrous metal industry and to discuss ways and means of stimulating growth to meet present and future requirements.

Industrial BRIEFS

A degree in nuclear engineering will be awarded in the future by the Kansas State College, Manhattan, Kan. The course will cover the fundamentals of atomic-energy and radio-tracer techniques, and basic engineering in design, mechanics and thermodynamics.

The first nongovernmental agency to be awarded a contract for titanium castings, National Research Corp., Cambridge, Mass., will go into pilot production in the very near future. The contract was awarded by the Army Ordnance Corps.

Linde Air Products Co. plans a new chemical plant near St. Marys, W. Va., to make silicones and silanes.

The Youngstown Sheet & Tube Co. has bought an interest in the Perrault Fibercast Corp., Tulsa, Okla., makers of glass- fiber reinforced plastic pipe. The Tulsa company's name will be changed to Fibercast Corp.

A magnifying lens which can be slipped into the window of a welder's mask has been designed by the Bausch & Lomb Optical Co., Rochester, N. Y. One use for it is that it improves the vision of welders who usually wear bifocals but find them awkward at work.

B. F. Goodrich Co. has recently developed "Pyrolock", a quick-drying material to spray on metal like paint and enables the treated surface to withstand high temperatures. The new product, developed for use in rockets and guided missiles, is described as a water-base inorganic material that bonds directly to clean metal without sandblasting or surface priming preparations.

General Motors Co., St. Louis, has purchased a gas-fired hydrogen furnace from Lindberg Engineering Co. of Chicago, which is said to turn out stampings from heat treating without the black or green oxidation stains sometimes caused by heat treating stainless steel.

Oak Ridge National Laboratory has announced the development of a process which may permit the use of ceramic-coated commercial nickel in jet engines, jet turbines, and other high-temperature devices.

Chapter Officer Resigns

W. C. Hunter has resigned his office of secretary-treasurer of the St. Louis Chapter A.S.M., and Julius Turk and Arthur H. L. Hunnius have agreed to serve through July 1, 1954 as secretary and treasurer, respectively. Mr. Turk is metallurgist at Emerson Electric Manufacturing Co., Washington Park, Ill., and Mr. Hunnius is office manager of the St. Louis branch of Carpenter Steel Co.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio

Stewart J. Stockett, Technical Abstracter

Assisted by Fred Body, Norma King, Thelma Sparks and Members of the Translation Group

A
General Metallurgical

248-A. Ion Exchange Finds Wider Use in Concentration and Recovery of Metals From Dilute Solutions. A. B. Mindler and C. F. Paulson. *Journal of Metals,* v. 5, Aug. 1953, p. 980-985.

Equipment, uses of ion exchange, concentration, recovery, limitations and possible applications in hydrometallurgy. Diagrams, graph, photograph. 25 ref. (A8)

249-A. Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 20, Apr. 1953, p. 163-170; May 1953, p. 205-212; June 1953, p. 273-280; July 1953, p. 313-320.

April issue covers "Foliated" to "Gadolinium"; May from "Gagger" to "Gneiss"; June "Gold" to "Hanger Crack"; and July "Hanging" to "Hiperco". (To be continued.) (A10)

250-A. Commercial Importance of Titanium Increasing, Market Potentially May Equal Stainless Steel. Franz R. Brotzen. *Metals,* v. 24, July 1953, p. 9-10, 17.

Uses, cost, recovery and chemical analysis of Ti as related to supply and demand. Tables. (A4, Ti)

251-A. The Economic Geology of the New Metals. Charles E. Melbye, Ben H. Parker, and Marshall C. Parsons. *Mines Magazine,* v. 43, Mar. 1953, p. 61-66.

Ores, economic value, and properties of Ti Zr, Hf, Nb, Ta, In, Ge, Ga, Li, Cs, Rb, Se, Te, and rare earth metals. Photographs, table. (A4, EG-d, e, f)

252-A. Buick Foundry's Dust Collectors Build "Dunes" Under Water. P. J. Leisen. *Plant,* v. 8, July 1953, p. 36-38.

Multiple-wash collectors which remove dirt and dust from cleaning room, core room, cupolas, sprue mills and knockout benches. Photographs. (A5, E general)

253-A. (French.) **Treatment of Aluminum Scrap for Producing Ingots With a High Technological Value.** Jacques Spirytus. *Fonderie,* May 1953, p. 2417-2430.

Defects existing in secondary Al ingots. Causes and remedies for porosity, cracking and gas holes. Photographs, diagrams, tables. 22 ref. (A8, E25, Al)

254-A. (French.) **In 1952 the Pechiney Co. Beat Its Own Production Records.** G. A. Baudart. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 127-129.

Increasing use and production of Al. Compares French position with world situation. (A4, Al)

255-A. (German.) **Economic Survey.** *Giesserei,* no. 13, June 25, 1953, p. 346-347.

Tabulates production figures on cast iron and cast steel in Germany from 1946 to March 1953. (A4, CI)

256-A. (German.) **Evolution of Production of Slag Wool in United Austrian Iron and Steel Works at Linz.** Othmar Rosenauer. *Stahl und Eisen,* v. 73, no. 13, June 1953, p. 845-847.

Evolution of process. Wool emerges as continuous fabric of quality superior to early product. Waterproofing experiments in progress. Diagrams. (A8)

257-A. (Portuguese.) **Metallurgy as a Factor in the Development of a Nation.** Jose Ermirio de Moraes. *Boletim da Associacao Brasileira de Metais,* v. 8, no. 29, Oct. 1952, p. 361-372.

Mining, exploration, processing and metal industries as economic factors in the development of Brazil. Tables. (A4)

258-A. (Russian.) **Science and Development of Soviet Metallurgy.** I. P. Bardin. *Priroda,* v. 41, no. 11, Nov. 1952, p. 11-17.

From the Soviet Revolution to present day. Photographs. 2 ref. (A general)

259-A. (Russian.) **A New Rise in Ferrous Metallurgy.** N. T. Giedtrov. *Priroda,* v. 41, no. 12, Dec. 1952, p. 62-64.

Developments in the Soviet Union during 1952. (A general, Fe)

260-A. (French.) **Importance and Economic Role in the Recovery of Nonferrous Metals.** *Métallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 515, 517-518, 527. (A4)

261-A. (German.) **Problems of European Integration.** H. Falk. *Metall,* v. 7, nos. 11/12, June 1953, p. 453-455.

Problems from standpoint of nonferrous metals industry. (A4, EG-a)

262-A. (German.) **Nonferrous Metals Convention, 1953.** H. Sennekamp. *Metall,* v. 7, nos. 11/12, June 1953, p. 456-458.

Position and development of nonferrous metals industry of West Germay. (A4, EG-a)

263-A. (German.) **Status of Nonferrous Metals in West Germany With Regard to Changing World Market Conditions.** *Metall,* v. 7, nos. 11/12, June 1953, p. 459-464.

Trend of metals prices; international conference on raw materials; status of Cu, Pb, Zn, Sn and Al; mining and metallurgy problems; and exports and imports. (A4, Cu, Pb, Zn, Sn, Al)

The coding symbols at the end of the abstracts refer to the ASM-SLA Metallurgical Literature Classification. For details write to the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

264-A. (German.) **Mystery-Shrouded 5th August 1953.** O. Schultze. *Metall,* v. 7, nos. 11/12, June 1953, p. 465-469.

States that Britain will decontrol Cu and links this occurrence with similar moves in Sn, Pb, Zn and Cu relative to national and international markets. (A4, Sn, Pb, Zn, Cu)

265-A. (German.) **Metals Marketers Convene in Baden-Baden.** H. Schroeder. *Metall,* v. 7, nos. 11/12, June 1953, p. 470-472.

Position of convention toward liquidity, sales taxes, investment credits, foreign markets, and cartel laws. (A4)

266-A. (German.) **Transactions of the Electrochemical Industry.** *Metall,* v. 7, nos. 11/12, June 1953, p. 473-476.

Balance sheets, financial needs, changes in activity, profit statements and dividends. Tables. (A4)

267-A. (German.) **Metals at the Trade Fair, Hannover, 1953.** F. Reidemeister. *Metall,* v. 7, nos. 11/12, June 1953, p. 481-485.

Semifabrication works and foundries; electrotechnical industry; construction of machines and equipment; and metal wares, fixtures and other devices. (A general)

268-A. (German.) **Metals Mirror.** *Metall,* v. 7, nos. 11/12, June 1953, p. 485-486.

Political overtones from Britain's decontrol of Cu; debates whether Inco's monopoly on Ni will end. (A4, Cu, Ni)

269-A. (German.) **Metals Abroad.** *Metall,* v. 7, nos. 11/12, June 1953, p. 487-489.

Metals markets relative to Cu, Zn, Pb, Sn, Al and the noble metals. (A4, Cu, Zn, Pb, Al, Sn, EG-c)

270-A. (German.) **Metals Market.** *Metall,* v. 7, nos. 11/12, June 1953, p. 490-491.

Position of Cu, Zn, Pb, Sn, and Al in West German metals market. (A4, Cu, Zn, Pb, Sn, Al)

271-A. (German.) **Metals Markets.** *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 6, June 1953, p. 241-242.

Touches on a free Cu market, decreased Pb and Zn tariffs of USA, further depression in Sn and Al market. (A4, Cu, Pb, Zn, Sn, Al)

272-A. Activities of the Institute. George S. Rose. *American Iron and Steel Institute,* New York, May 1953, 34 p.

A report of 1952 activities explaining and relating the work of the Institute and its committees. (A general)

273-A. Some Economic Aspects of the European Steel Industry. Michael J. Layton. *American Iron and Steel Institute,* New York, May 1953, 19 p.

Future demand for steel in western Europe and their capacity to meet that demand. Table. (A4, ST)

274-A. (French.) **Management and Organization of Metallurgical Enterprises.** Pierre Lamy. *Métallurgie et la Construction Mécanique*, v. 85, no. 1, Jan. 1953, p. 61, 63, 65, 67; no. 2, Feb. 1953, p. 83-85, 87; no. 3, Mar. 1953, p. 219, 221, 223; no. 5, May 1953, p. 339-340, 343.

Part I: Problem of obtaining supplies. Part II: Production sections, recording of work, and planning. Part III: Functions of the commercial service, its "tools", and its relations to manufacturing and bookkeeping. Part IV: Role and function of the board of directors and various administrative groups. (A4, A5, A6)

275-A. (Book.) **Metal Statistics.** Ed. 46. 872 p. 1953. American Metal Market, 18 Cliff St., New York, N. Y. $2.50.

Statistical information on ferrous and nonferrous metals, and miscellaneous economic subjects. (A4)

276-A. (Pamphlet.) **Industrial Research and Development.** U. S. Bureau of Labor Statistics, Washington, D. C., Jan. 1953, 42 p.

Preliminary report on nationwide survey of companies engaged in scientific and engineering research and development conducted in mid-1952. Tables, graphs. (A9)

B

Raw Materials and Ore Preparation

153-B. Refractories. Their Classification. Ray A. Witschey. *Canadian Metals*, July 1953, p. 28.

Classification based on chemical and mineralogical separations and physical form. (B19)

154-B. The Electrical Conductivity of Wüstite Melts. Henry Inouye, J. W. Tomlinson, and John Chipman. *Faraday Society, Transactions*, v. 49, July 1953, p. 796-801.

As an approach to slag reactions the electric conductances of liquid wüstite, the wüstite + silica system, and SiO_2 were examined. Diagrams, table, graphs. 5 ref. (B21, P15, ST)

155-B. The Pumping, Transmission and Burning of Tar and Pitch. Warren A. Pond. *Iron and Steel Engineer*, v. 30, July 1953, p. 94-97; disc., p. 98-99.

Selection of equipment for handling and burning tar and pitch from coke ovens in steel mill furnaces. (B18)

156-B. Metals, Mining and Meditation. Bruce W. Gonser. *Mines Magazine*, v. 43, May 1953, p. 33, 45, 50.

Unusual sources of metals including the ocean and plants. (B10)

157-B. Recent Improvements in Flotation of Oxide Manganese Ores. Joe B. Rosenbaum and Carl H. Schack. *Mines Magazine*, v. 43, Mar. 1953, p. 67-69.

Ores tested and treated, laboratory developments, pilot plant operations, process limitations, and possibilities. (B14, Mn)

158-B. The Recovery of Copper From Low-Grade Material. Lyle M. Barker. *Mines Magazine*, v. 43, Mar. 1953, p. 99-102.

Shows that mass production makes recovery profitable. Beneficiation process and equipment. Photographs. (B14, Cu)

159-B. A Contribution to the Study of Modern Ore Dressing. Clarence Thom. *Mines Magazine*, v. 43, May 1953, p. 27-31.

Regional problems. Procedure for preliminary laboratory examination of ores. Photographs. (B13, B14)

160-B. (German.) **Phosphor-Alloyed, Sintered Steel.** Fritz Eisenkolb. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, May-June 1953, p. 257-266.

Possibilities of alloying P to Fe. Photographs, tables, graphs. 13 ref. (B16, ST)

161-B. (Portuguese.) **Estimate of the Iron Ore Reserves of Brazil. Geographic Distribution of Deposits.** Luciano Jacques de Moraes. *Boletim da Associacao Brasileira de Metais*, v. 8, no. 29, Oct. 1952. p. 389-407.

Maps. 96 ref. (B10, Fe)

162-B. (Portuguese.) **Columbium and Tantalum: the Jet-Propulsion Metals.** Geir Campos. *Engenharia, Mineracao E Metalurgia*, v. 18, no. 105, Mar.-Apr. 1953, p. 123-125.

World deposits, particularly those in northeastern Brazil. Photographs, table. 13 ref. (B10, Cb, Ta)

163-B. (Russian.) **Jigging of Rudabania Iron Ores in Heavy Suspension.** G. Tarian and G. Palfi. *Acta Technica Academiae Scientiarum Hungaricae*, v. 3, no. 3-4, 1952, p. 365-379.

Separation by specific weight found preferable to jigging in pure water. Photographs, graphs. 2 ref. (B14, Fe)

164-B. Recovering Minute Gold Contents From Chloridized Residues. C. C. Downie. *Mining Journal*, v. 241, July 31, 1953, p. 138-139.

Different roasting systems, features in recovery of the small Au content, and reactions of Au precipitation. (B15, Au)

165-B. Supplementary Tests on Ore From the Mother Lode Mine, Ravenswood. J. T. Woodcock and H. H. Dunkin. Commonwealth Scientific and Industrial Research Organization and Mining Department. University of Melbourne, Australia, Investigation 425, 1952, 3 p.

Data on recovery of Au from the concentrates. Tables. (B14, Au)

166-B. Gold and Sulphur Recovery Tests on a Sample of Ore From Hill 50 Gold Mine (N. L.), Mount Magnet, W. A. Evan E. Hughes, C. H. Meharry, and R. A. Hobson. Commonwealth Scientific and Industrial Research Organization and Kalgoorlie School of Mines, Western Australia, Report 507, Dec. 11, 1951, 18 p.

Tests on the recovery of S as a sulfide concentrate suitable for H_2SO_4 manufacture, without seriously affecting the recovery of Au. Tables. (B14, Au)

167-B. (Hungarian.) **Present Problems of Hungarian Production of Ferro-Alloys.** Gyorgy Dobos. *Aluminium*, v. 4, no. 11, Nov. 1952, p. 241-251.

Theoretical and practical points with special regard to the technological problems of those branches which are new in Hungary. Production of ferrotungsten, ferromolybdenum, ferrovanadium, and ferrotitanium. Tables, graphs, diagrams. (B22, Fe, W, Mo, V, Ti)

168-B. (Russian.) **Decreasing the Sulphur Content in Coal Flotation Concentrates.** D. S. Emel'ianov. *Ugol'*, no. 4, 1953, p. 36-39.

Function of flotation oil foam, time and size of particles. Tables, diagrams. (B14, S)

169-B. Laboratory Procedures for Determining Pelletizing Characteristics of Iron Ore Concentrates. T. E. Ban and L. J. Erck. *Mining Engineering*, v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 196, 1953, p. 803-811.

Strength-temperature relationships in pelletizing; effect of chemical additives on agglomeration; and crushing, abrasion, and impact resistance of the pelletized products. Concentrates of five different Fe ores were used. Graphs, photographs, tables. 12 ref. (B16, Fe)

170-B. An Investigation of the Collecting Effects of Fatty Acids in Tall Oil on Oxide Minerals, Particularly on Ilmenite. R. T. Hukki and O. Vartiainen. *Mining Engineering*, v. 5, Aug. 1953, *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 196, 1953, p. 818-820.

Collecting power was found to increase with increasing unsaturation. Linoleic acid was found to be an excellent collector. Graphs, photographs. 10 ref. (B14)

171-B. The Charles M. Schwab Memorial Lecture. Research and the Minor Constituents of Steel. John Chipman. *American Iron and Steel Institute*, May 1953, 21 p.

Importance of the minor constituents in steel. Graphs. (B22, ST)

172-B. Review of European Operating and Technical Practices. William C. Bell. *American Iron and Steel Institute*, New York, May 1953, 54 p.

Need in Europe for rapid and economical refining processes. Production of coke, coal, Fe and steel. Tables, graphs, photographs, diagrams. (B18, D general, CI, CN)

173-B. Refractories in the Service of Industry. D. Dixon. *Refractories Journal*, June 1953, p. 246-248, 255; July 1953, p. 297-300.

Technical progress, changing needs and output of ceramic refractories. Use of fireclay refractories in the iron and steel industry. Photographs. (B19, D general)

174-B. (Swedish.) **Fluxes For Melting Aluminum Alloys.** T. Malmberg and G. Coyet. *Gjuteriet*, v. 43, no. 6, June 1953, p. 109-114.

Different methods for comparing the efficiency of different fluxes. Photographs, tables, diagrams. (B21, Al)

175-B. (Book.) **Non-Ferrous Ore Dressing in the U. S. A. O. E. E. C. Documentation.** *Report of the Technical Assistance Mission*, no. 54. 210 p. H. M. Stationery Office, London. 10s.

Summarizes latest designs and developments in processes of ore-dressing and reports of unit processes. Diagrams.
(B general, Pb, Zn, Cu, Au, Ti)

176-B. (Book—French.) **(Mechanical Preparation and Concentration of Minerals by Flotation and Heavy Media Separation.) Préparation Mecanique et Concentration des Minerais par Flotation et sur Liqueurs Denses.** Ed. 2. Horace Havre. 759 p. 1952. Librairie Polytechnique Ch. Béranger, Paris, 15, Rue des Saints-Peres.

Presents a theoretical and practical report on machinery and methods of ore concentration. (B14)

C

Nonferrous Extraction and Refining

123-C. Vacuum Dezincing of Desilverized Lead Bullion. T. R. A. Davey. *Journal of Metals*, v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 991-997.

Evaporation processes, rate of distillation, practical application, a comparison with other theoretical work, precondensation and the distillation process. Graphs, tables. 16 ref. (C25, Pb, Zn)

124-C. Refining of Secondary Lead. P. H. Bootman. *Metal Industry,* v. 83, July 17, 1953, p. 51-52.

The Harris process. Tables. (C21, Pb)

125-C. (French.) Investigations on the Electrolysis of Melted Aluminates. Etienne Bonnier. *Annales de Physique,* v. 8, Mar.-Apr. 1953, p. 259-312.

Electrolysis of Na, Ca, Ba and Mg-aluminates. A chapter is devoted to each compound. Tables, graphs. 77 ref. (C23, Al)

126-C. (German.) Extraction of Antimony by Volatilizing Roasting Concentrates Containing Noble Metals. J. Szeki. *Acta Technica Academiae Scientiarum Hungaricae,* v. 3, nos. 3-4, 1952, p. 319-332.

Results of experiment. Tables. 6 ref. (C22, Sb)

127-C. (German.) Copper Refining in Rotary Furnaces. A. Geleji and J. Schey. *Acta Technica Academiae Scientiarum Hungaricae,* v. 3, no. 3-4, 1952, p. 393-425.

Advantages of short and long furnaces. Photographs, micrographs, graphs, tables, diagrams. 15 ref. (C21, Cu)

128-C. (German.) Refining of Magnesium. Karl Ernst Mann. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 264-266.

Reports that Fe, Si, Al, and Mn in varying degrees can be separated from Mg melts by Zr. Remaining Zr can be removed by H_2 or Cl_2. Mg thus refined is very corrosion resistant. Photographs, tables. (C28, R general, Mg)

129-C. (German.) Precipitation of Chemically Pure Vanadium From the Gas Phase. G. Jantsch and F. Zemek. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 157-159.

11 references. (C22, V)

130-C. (Portuguese.) Development of Lead-Refining Metallurgy. Tharcisio D. de Souza Santos. *Boletim da Associacao Brasileira de Metais,* v. 8, no. 29, Oct. 1952, p. 373-388.

Historical report. (C21)

131-C. Double Melting Produces Homogeneous Titanium Alloys. R. J. Van Thyne, D. H. Turner, and H. D. Kessler. *Iron Age,* v. 172, Aug. 6, 1953, p. 146-148.

Double arc-melting method. Diagram, photographs. (C21, Ti)

132-C. (French.) Electrothermal Production of Castings. M. Dabala. *Métallurgie et la Construction Mécanique,* v. 85, no. 6, June 1953, p. 447, 449, 451, 453, 455, 457-458, 461-463, 465, 467.

History of electric melting processes, comparison between various furnaces, chemical reactions in the electric blast furnace, general characteristics of slags and applications, electrical properties of the charge, and evolution of the furnace construction. Photographs, diagrams, graph. (C23, D5, Mg, Al, Cu, CI)

133-C. (German.) Process for Producing Lead Alloys. H. Kiessler. *Metall,* v. 7, nos. 11/12, June 1953, p. 442-444.

Production process for metallurgical soft Pb, hard Pb and printing metals Pb scrap and $PbSO_4$ which needs no oxidizing roasting. Tables. (C general, Pb)

134-C. (German.) Oxidation Velocity of Antimony During Refining of Crude Lead. P. Rontgen, W. Hilgers, and H. J. Gottschol. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 6, no. 6, June 1953, p. 220-226.

Behavior of Sb under various oxidation conditions and under influence of Sn, As, Zn, Bi and Cu additions was tested between 750 and 800° C. Graphs, tables. 19 ref. (C21, Pb)

135-C. (Hungarian.) Increasing Current Efficiency in Aluminum Electrolysis. Gyula Szentivanyi. *Aluminium,* v. 5, no. 3, March 1953, p. 56-61.

Theoretical effect of temperature, current density, distance between anode and cathode, and composition of electrolyte upon current efficiency. Practical application of data in a Hungarian Al plant. (C23, Al)

136-C. (Hungarian.) Possibilities for Extracting Rare Metals From the Raw Materials and Byproducts of Alumina Production. II. Elemer Papp. *Aluminium,* v. 5, no. 3, March, 1953, p. 61-63.

Various methods. Importance of producing Ga and radiating Th in Hungary. (C general, Al, Ga, Th)

137-C. (Hungarian.) The Processing of Liquation Residues. Laszlo Jakoby. *Aluminium,* v. 5, no. 4, April 1953, p. 84-88.

Various methods and the Rau process. (C28, Cu, Pb, Sn, Sb)

138-C. (Hungarian.) Experiments on the Extraction of Radioactive Material From Red Mud. Kalman Méhes and Frigyes Macher. *Aluminium,* v. 4, no. 11, Nov. 1952, p. 262-263.

Experimental details. Measurements made with a beta-sensitive microcounter with graphite cylinder. Tables. (C general, S19, EG-h)

139-C. (Russian.) Electrolytic Precipitation of Zinc-Cadmium Alloys. N. T. Kudriavtsev and E. F. Pereturina. *Zhurnal Prikladnoi Khimii,* v. 26, no. 2, Feb. 1953, p. 155-159.

Dependence of the two metals in precipitation and influence of other factors. Corrosion data. Tables. (C23, R general, Zn, Cd)

140-C. Medium-Frequency Induction Furnaces in the Precious Metals Industry. F. von Burg. *Brown Boveri Review,* v. 39, Nov./Dec. 1952, p. 436-442.

Advantages which induction heating offers precious metals industry. Problems associated with crucible composition and melting technique. Special reference to unique features of the vacuum-melting process. Choice of operation frequency and size of generator and furnace. (C21, C25, EG-c)

141-C. Arc Melting as a Lab Tool. *Steel,* v. 133, Aug. 17, 1953, p. 168, 170, 172, 174.

Process and equipment as developed for melting of Ti and Zr. (C21, Ti, Zr)

D

Ferrous Reduction and Refining

268-D. Casting Ingot Moulds. J. E. Rehder. *Canadian Metals,* July 1953, p. 30-31.

General arrangement of apparatus, sand preparation, melting and pouring. Photographs. (D9, CI)

269-D. Rehabilitating a Blast Furnace and Associated Equipment. W. C. Daniels. *Iron and Steel Engineer,* v. 30, July 1953, p. 57-65; disc., p. 65-66.

Case history of rebuilding a blast furnace unit. Photographs. (D1)

270-D. Simplified Construction of Heat Balances for the Blast-Furnace Process. S. Klemantaski. *Iron and Steel Institute, Journal,* v. 174, July 1953, p. 236-241.

Data for constructing heat balances by stages for any combination of subprocesses. Tables, graphs. (D1, CI)

271-D. Design Features of Fairless Works Open Hearth. H. A. Parker. *Journal of Metals,* v. 5, Aug. 1953, p. 976-978.

Layout of furnaces and equipment. Photograph, diagrams. (D2)

272-D. Deoxidation and Degasification Practice for Basic Electric Furnace Alloy Steels. A. L. Ascik. *Journal of Metals,* v. 5, Aug. 1953, p. 986-990.

Importance of deoxidation and degasification in producing alloy steels. (D5, Cr, Ag, Mn, Al, AY)

273-D. Reducing Period in Stainless Steel Melting. H. P. Rassbach and E. R. Saunders. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1009-1016.

Stainless steel melting practices for higher efficiency. Graphs, tables. 8 ref. (D5, SS)

274-D. (French.) Observations on the Advisability of a Second Calcium-Sodium Slagging in the Converter. Delong and Demarteau. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* no. 6, 1953, p. 961-970.

Efficiency of above in refining steel. Tables, graphs. (D3, CN)

275-D. (French.) Study of the Elimination of Silicon From Pig Iron by Pre-Blowing. M. Tavard. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* no. 6, 1953, p. 971-983.

Concludes that preblowing used to lower the Si content of Thomas-Gilchrist pigs must be done in a basic converter to avoid excessive loss of Fe and Mn. Tables, graphs. (D3, CN)

276-D. (German.) Influence of Partial Pressure of the Air Blast on Nitrogen Pick-Up. Theo Kootz. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 203-206.

Varying amounts of N_2 in air blast processes and amounts of N_2 absorbed by steel. (D3, ST)

277-D. (German.) Behavior of Hydrogen in Production of Steel. Erich Piper, Heinz Hagedorn, and Horst Backes. *Stahl und Eisen,* v. 73, no. 13, June 1953, p. 817-828.

Reports on improved sampling and analysis whereby H_2 contents are determinable from crude iron to completed steel ingot. H_2 content rose after tapping in most cases. Behavior of H_2 in stored ingots. Diagrams, graphs, tables. 44 ref. (D general, S11, ST)

278-D. (German.) Industrial Experiments With the Blast Furnace, Especially With Regard to the Question of Nitrogen in Bessemer Crude Iron and in Steel. Werner Geller. *Stahl und Eisen,* v. 73, no. 13, June 1953, p. 851-853.

Effects of slag composition, blast temperature and atmospheric conditions on N_2 content. (D2, CI, CN)

279-D. (Russian.) Complex Use of Blast-Furnace Slag. P. Budnikov. *Za Ekonomiiu Materialov,* no. 4, Nov. 1952, p. 59-65.

Method for obtaining clinkerless cement. Tables. (D1)

280-D. Metal Casting Methods. IV. Ferrous Ingots. J. B. McIntyre. *Metallurgia,* v. 48, no. 285, July 1953, p. 21-26.

Casting of pig iron. Problems involved in ingot production and their solution. Diagrams, photographs. 12 ref. (D9, CI, CN)

281-D. (French.) Heating of Open-hearth Furnaces With Fuel Oil. J. E. Lafon. *Métallurgie et la Construction Mécanique,* v. 85, no. 3, Mar. 1953, p. 205, 207, 209; no. 4, Apr. 1953, p. 295, 297, 299.

Part I: Types of fuel oil and design of burners and furnace. Part II: Thermal advantages of using fuel oil and summary of results obtained in England and France. Tables, diagram. (D2)

282-D. (French.) The Charging of Blast Furnaces With Powdered Raw Materials. Paul Thierry. *Métallurgie*

et la Construction Mécanique, v. 85, no. 5, May 1953, p. 345, 347, 349, 351.

Origin of various powder materials and the methods used in charging the furnaces with them. Wetting, direct injection into the bottom of the furnace and pressing of briquetts. Graphs. (D1, Fe)

283-D. (French.) **Increasing the Productivity of Open-Hearth Furnaces.** J. E. Lafon. *Métallurgie et la Construction Mécanique*, v. 85, no. 5, May 1953, p. 393, 395, 397.

Problem of the time element in effecting fuel savings. Repair, charging, smelting, refining and tapping are analyzed. Diagrams. (D2)

284-D. (French.) **The Use of Methane in the Italian Iron and Steel Industry.** A. Scortecci. *Reveue de Metallurgie*, v. 50, no. 4, Apr. 1953, p. 253-262; disc., p. 262-263.

Principal sources and uses. Application to the openhearth furnace fired with a mixture of naphtha and CH_4. Diagrams, graphs, tables, photographs. 18 ref. (D2)

285-D. (French.) **A Note on the Making of Small Billets of Semikilled Steel, Produced With a Single Slag in a Basic Electric Arc Furnace.** Max Petitdidier. *Revue de Metallurgie*, v. 50, no. 3, Mar. 1953, p. 177-186; disc., p. 186-188.

Making of billet ingots and blooms for immediate utilization in rolling mills. Graphs, diagrams. 5 ref. (D5, CN)

286-D. (French.) **The Volume Flow-Recording Apparatus Adapted to the Basic Bessemer Process of Using Oxygen Enrichment.** R. Michaux and P. Leroy. *Revue de Métallurgie*, v. 50, no. 3, Mar. 1953, p. 215-228.

Apparatus designed to record the flow of air blown into a converter. Diagrams, graphs, photographs. 5 ref. (D3, S)

287-D. (Hungarian.) **Dry Granulation of Blast-Furnace Slags.** Robert Forbath. *Kohaszati Lapok*, v. 7, no. 6, June 1952, p. 121-127.

Preparation of blast furnace slag for use in portland cement. Diagrams, graphs. (D1, A8)

288-D. Design and Construction of a Carbon Lined Blast Furnace. J. M. Stapleton and W. S. Debenham. *American Iron and Steel Institute*, New York, May 1953, 13 p.; *Industrial Heating*, v. 20, Aug. 1953, p. 1582, 1584, 1586, 1588.

Possibility of increased production through thinner refractory linings and increased furnace size was investigated. Tables, graphs. (D1)

289-D. (Swedish.) **Large Silicate Inclusions in Acid Open-Hearth Ball Bearing Steel During Different Stages of the Heat.** S. Baeckström. *Jernkontorets Annaler*, v. 137, no. 4, 1953, p. 117-127.

Study of steel quality at different stages of manufacture. Tables, diagrams. (D2, CN)

290-D. (Book—German.) **(The Basic Converter Method.) Das basische Windfrishverfahren.** Karl Eichel. 378 p. 1952. Verlag Technik, Berlin, Germany.

Reviews all aspects of steelmaking by basic converter methods. (D3)

E

Foundry

439-E. Production Control at Alcan's Aluminum Foundry. V. J. Zabec. *Canadian Chemical Processing*, v. 37, July 1953, p. 66-67.

Production methods and laboratory equipment. Photographs. (E general, Al, Mg)

440-E. Grain Refinement of Aluminum and Its Alloys. D. A. Dodson. *Canadian Metals*, July 1953, p. 24-27.

Factors involved, grain refining agents, and foundry practices. (E25, Al)

441-E. What the Fluidity Test Reveals About Gray Cast Iron. Lew F. Porter and Philip C. Rosenthal. *Foundry*, v. 81, Aug. 1953, p. 94-99, 245-249.

What has been learned about the behavior of gray cast iron from the fluidity test and how it can serve as a foundry tool. Graphs, diagrams. (E25, CI)

442-E. Outstanding Opportunities for the Foundry Industry. James H. Smith. *Foundry*, v. 81, Aug. 1953, p. 100-107.

Molding methods and materials; metallurgy and heat treatment of cast iron; methods engineering; and educational programs for the foundry industry. Photographs. (E general, J general, CI)

443-E. Studies High Pressure Molding. Richard Heine and Tom Barlow. *Foundry*, v. 81, Aug. 1953, p. 146, 148, 229.

Research pertaining to the process, sands and resins used. Graphs. (E19, E18)

444-E. Things to Watch in Nonferrous Foundry Practice. Hiram Brown. *Foundry*, v. 81, Aug. 1953, p. 108-110, 236-237.

Practices which have important influence on casting quality. Photographs. (E general, EG-a)

445-E. Formulas for Determining Weights of Castings. *Foundry*, v. 81, Aug. 1953, p. 151-152.

Tables and diagrams. (E general)

446-E. How Fast Should a Mold be Poured? Harry W. Dietert. *Foundry*, v. 81, Aug. 1953, p. 205-206.

Pouring time formula and graphs. (E23, CI)

447-E. Cable Link Conveyor Offers Unusual Flexibility. W. G. Patton. *Iron Age*, v. 172, July 30, 1953, p. 92-93.

Conveyor flexible in two planes permits quick dipping of 110-lb. cores. (E21, A5)

448-E. The Apparent Thermal Conductivities of Moulding Materials at High Temperatures. D. V. Atterton. *Iron and Steel Institute, Journal*, v. 174, July 1953, p. 201-211; disc., p. 211.

Data in the temperature range 20-1600° C. Tables, graphs, diagrams. 15 ref. (E19)

449-E. Refractories for Aluminium Melting. *Light Metals*, v. 16, July 1953, p. 232-234.

Effect of molten Al on refractories. Lists refractories for reverberatory, liquation, electric, resistor-heated and heat treatment furnaces. (E10, Al)

450-E. Dielectric Core Baking. *Metal Industry*, v. 83, July 17, 1953, p. 45-46.

Study of operations with synthetic resin binders. Diagram, table, photographs. (E21)

451-E. Operational Research and Materials Handling. J. Murdoch. *Operational Research Quarterly*, v. 4, June 1953, p. 25-29.

Benefits derived from use of operational research in a foundry. Diagrams. (E general, S12)

452-E. Combine and Eliminate. The Key to Economical Use of Die Castings. S. Szelwach. *Precision Metal Molding*, v. 11, Aug. 1953, p. 28-29, 72.

Redesign of a rangefinder. Photographs. (E13)

453-E. Flatness and Dimension Are Held in These Shell Mold Castings. Walter Cuskie. *Precision Metal Molding*, v. 11, Aug. 1953, p. 37, 65-66.

How shell molding reduces costs. (E16)

454-E. Lead Die Casting. Case History of a Part That Was "Impossible" by Any Other Method. W. M. Halliday. *Precision Metal Molding*, v. 11, Aug. 1953, p. 42-43, 84-86.

Production of a conical sealing plug. Dimensions and way of forming not formerly feasible. (E13, Pb)

455-E. (French.) **Drying Foundry Molds on the Spot.** Georges Ulmer and Maurice Decrop. *Fonderie*, May 1953, p. 3431-3443.

Heating by electricity, and by gas, liquid and solid fuels. Choice of drying apparatus. Tables, graphs, photographs, diagrams. (E19)

456-E. (French.) **Making a Tap Hole in the Cupola by Means of a Template.** *Fonderie*, May 1953, p. 3445-3446.

Diagrams. (E10)

457-E. (German.) **Retrospective View of the Technical Exposition, Hanover, 1953.** H. Jungblut. *Giesserei*, no. 13, June 25, 1953, p. 325-334.

Machines for treating foundry sand and for making molds and cores; equipment for melting; techniques of cleaning and conveyance; laboratory arrangements and general industrial layouts. Photographs, diagrams. (E general)

458-E. (German.) **Rammed-Crucible, Line-Frequency, Induction Furnace for a Three-Phase Power Supply.** Robert Lethen. *Zeitschrift für Metallkunde*, v. 44, no. 6, June 1953, p. 267-272.

The problem of multiphasic connection to 3-phase mains. A single phase furnace for Fe and Al melting which is wired so that a 3-phase symmetrical load exists for the power supply. Photographs, diagrams. 4 ref. (E10, Fe, Al)

459-E. (Russian.) **Problems of the Choice of High-Frequency Generators for Induction Melting Furnaces.** G. S. Vainberg. *Promyshlennaia Energetika*, v. 9, no. 11, Nov. 1952, p. 23-24.

Data and suggestions. Tables. 2 ref. (E10)

460-E. (Russian.) **Precision Casting With Meltable Patterns.** M. Kornakov. *Za Ekonomiiu Materialov*, no. 3, Oct. 1952, p. 72-76.

Savings resulting from use of precision castings instead of forgings. Stainless and carbon steels. (E15, E17, ST)

461-E. (Russian.) **Centrifugal Casting of Gears.** I. Bobrov and K. Smirnova. *Za Ekonomiiu Materialov*, no. 4, Nov. 1952, p. 77-79.

Apparatus used. Diagrams. (E14)

462-E. Effects of Mould Resistance on Internal Stress in Sand Castings. R. N. Parkins and A. Cowan. *Foundry Trade Journal*, v. 95, July 23, 1953, p. 105-111.

Experimental method and results. Photograph, tables, graphs, diagrams. 5 ref. (E11, Cu, Al, CI)

463-E. Operating Experiences With Hot-Blast Cupolas in Great Britain. F. C. Evans. *Foundry Trade Journal*, v. 95, July 23, 1953, p. 113-117.

Results obtained using British fuels and materials. Equipment. Diagrams, graphs, photograph. (E10, Si, Mn, S, Fe, CI)

464-E. Another Hot-Blast Cupola Plant. *Foundry Trade Journal*, v. 95, July 23, 1953, p. 119-122.

Describes new installation and its operation. Diagram, photographs. (E10)

465-E. Estimating Construction Costs of Die Casting Dies. H. K. Barton. *Machinery* (London), v. 83, July 31, 1953, p. 223-230.

Different operations which must be considered in estimating the costs. Tables. (E13, TS)

466-E. The Overseas Foundry. *Overseas Engineer*, v. 27, Aug. 1953, p. 28-29.

Overcoming fuel problems, fur-

nace atmosphere control and Al alloy die casting. Photographs, tables. (E general, Al)

467-E. (French.) **Contribution for Microscopical Examination of Core Binders.** M. Franz Roll. *Fonderie*, no. 89, June 1953, p. 3480-3487.

Methods and equipment. Photographs, micrographs. (E18)

468-E. (French.) **Defects of Pressure Castings.** R. Grunberg. *Métallurgie et la Construction Mécanique*, v. 85, no. 1, Jan. 1953, p. 37, 39, 41; no. 2, Feb. 1953, p. 113, 115; no. 3, Mar. 1953, p. 175, 177, 179; no. 4, Apr. 1953, p. 265, 267.

Part 1: Classifies various defects according to the nature of the piece and emphasizes surface defects. Part 2: Influence of foreign agents. Part 3: Irregularities influencing precision and mechanical characteristics of cast pieces. Part 4: Composition and structure of Zn, Al, and Mg alloys and irregularities influencing machinability. (To be continued) (E13, Zn, Al, Mg, AY)

469-E. (French.) **Graphs in the Foundry, Guides for Technical Management.** J. Pascal. *Métallurgie et la Construction Mécanique*, v. 85, no. 3, Mar. 1953, p. 167-168, 171, 173; no. 4, Apr. 1953, p. 259, 261, 263; no. 5, May 1953, p. 357-358.

Value of graphs showing tonnage charged for each successive heat, tonnage of waste produced, yields, production results and movement of supplies. Graphs. (E general)

470-E. (French.) **Core Work in Foundries. Steel, Cast Iron, Bronze.** Marcel Guédras. *Métallurgie et la Construction Mécanique*, v. 85, no. 5, May 1953, p. 361, 363, 365, 367.

Function of the core in casting, types of sand, its constituents and its preparation. Table, photographs. (E21, E18, Cu, CI)

471-E. (French.) **Pressure Casting, One of the Processes for Mass Production.** R. Grunberg. *Métallurgie et la Construction Mécanique*, v. 85, no. 5, May 1953, p. 369, 371, 373.

Methods of pressure casting and the materials necessary for each. Tables.
(E13, Sn, Pb, Zn, Al, Mg, Cu, CI)

472-E. (French.) **Mechanized Casting.** J. Pascal. *Métallurgie et la Construction Mécanique*, v. 85, no. 6, June 1953, p. 469-471, 473, 475, 477.

Historical survey of molding machines with operating characteristics. Diagrams, photographs. (E19)

473-E. (French.) **Magnesium Pressure Castings for Automobiles.** *Métallurgie et la Construction Mécanique*, v. 85, no. 6, June 1953, p. 479, 481.

Advantages and savings effected by the use of Mg in motor parts. Graph. (To be continued)
(E13, T21, Mg)

474-E. (German.) **Comparison of Costs Between Acid and Basic Cupola Furnaces.** H. Schmidt. *Giesserei*, v. 40, no. 12, June 1953, p. 301-304.

Analyzes costs. Tables. (E10, CI)

475-E. (German.) **Further Use of Old Sand.** H. Hickisch. *Giesserei*, v. 40, no. 12, June 1953, p. 308-309.

Computes mathematically the amount of dust permissible in reclaimed foundry sand. Graph. (E18)

476-E. (German.) **Hints on Economic Procedure in a Small, Light-Metals Foundry.** H. Mahr. *Giesserei*, v. 40, no. 12, June 1953, p. 315-318.

Layout of foundry in case of limited space, individual manufacture of large pieces, assembly-line technique, better use of space by stack and open casting, and use of models. Diagrams. (E general)

477-E. (German.) **Foundry Machines.** C. Stieler. *VDI, Zeitschrift des Vereines deutscher Ingenieure*, v. 95, no. 19, July 1, 1953, p. 572-574.

Molding, core injection, shake-out, and cleaning equipment. Diagrams, photographs. 4 ref. (E19, E21, E24)

478-E. (Hungarian.) **Preparatory Work in Foundries.** Sandor Hargitay. *Öntöde*, v. 3, no. 11, Nov. 1952, p. 251-259.

Proper construction of molds for hand and machine casting. Organization of casting operations. Diagrams, photograph. (E17)

479-E. (Hungarian.) **Ideal Handling of Molds and Other Experiments.** Béla Körös. *Öntöde*, v. 3, no. 11, Nov. 1952, p. 259-264.

Experiments for establishing factors for reducing wear of molds. Tables, graphs. (E19)

480-E. (Hungarian.) **Prerequisites for the Manufacture of Nodular Cast Iron.** Istvan Karsay. *Öntöde*, v. 4, no. 2, Feb. 1953, p. 25-30.

Theoretical explanations for the formation of spheroidal graphite. Production, effect of addition elements, and applications. Diagrams, micrographs. 11 ref. (E25, CI)

481-E. (Hungarian.) **Hungarian Bentonites as Foundry Binding Agents.** Janos Barna. *Öntöde*, v. 4, no. 2, Feb. 1953, p. 30-39.

Types of Hungarian bentonites, their properties and binding capacity in the crude and dried state and after heat treatment. Graphs. 21 ref. (E18)

482-E. (Hungarian.) **The Casting of Iron Rolls From the Reverberatory Furnace.** Aladar Schleicher. *Öntöde* v. 4, no. 2, Feb. 1953, p. 45-58.

Compares use of above with cupola furnace. 11 ref. (E10, CI)

483-E. (Hungarian.) **The Technology of Core Binding With Water Glass.** Janos Szekeres. *Öntöde*, v. 4, no. 3, Mar. 1953, p. 49-56.

Technical experiments. Effect of water glass concentration on binding capacity and viewpoints to be considered in determining the composition of the core. Graphs, photograph, diagram. (E21)

484-E. (Hungarian.) **1952 Hungarian Experiments for the Production of Nodular Chilled Iron Rolls.** Béla Körös. *Öntöde*, v. 4, no. 4, Apr. 1953, p. 73-82.

Reports on experimental program. Details of processes and results are outlined and tabulated. Micrographs. (E25, CI)

485-E. (Hungarian.) **The Production of Pure Iron Castings by the Use of Centrifugal Casting.** Sandor Vékony. *Öntöde*, v. 4, no. 4, Apr. 1953, p. 91-94.

Pilot plant experiments. Diagrams, graphs. (E14, Fe)

486-E. (Swedish.) **Defects in Castings and Their Causes. IV. Causal Analysis of Nine Types of Surface Defects.** Jörgen Drachmann, Göthe Fernheden, and Holger Pettersson. *Gjuteriet*, v. 43, no. 5, May 1953, p. 81-89.

Rough surface, burn-on, metal penetration, flash, strain, swell, cuts and washes. Complete discussion of burn-on with two principal causes. Photographs. (E25)

487-E. The Status, Development and the Possible Australian Future of Spheroidal Graphite Cast Irons. L. C. Bogan. *Australasian Engineer*, Mar. 1953, p. 66-72; Apr. 1953, p. 46-52; May 1953, p. 42-46; disc., p. 46-52.

Paper presented to The Australian Institute of Metals, Newcastle Branch, Oct. 15, 1952. History of spheroidal graphite structures in cast iron. Basic metallurgical principles for commercial manufacture of nodular iron by the Mg process are provided. Castability and founding properties, heat treating and mechanical properties. Commercial techniques. Micrographs. 42 ref. (E25, Q general, M general, CI)

488-E. Production of Diesel-Engine Castings in Grey Iron. J. R. Charlton. *Foundry Trade Journal*, v. 95, July 30, 1953, p. 137-145.

Methods adopted in a jobbing foundry. Photographs. (E11, CI)

489-E. Ferrous Castings in the Refractories Industry. E. F. Brown. *Refractories Journal*, July 1953, p. 289-293; disc., p. 294-296.

Manufacture and use of wear-resistant castings. Photographs. (E11, T29, CI)

490-E. The Lister Blackstone Grey Iron Foundry. *Australasian Engineer*, May 7, 1953, p. 53-55.

Plant and techniques. Photographs. (E general, CI)

491-E. Straight Line Setup for Casting Tank Hulls. Thomas Mac New. *Automotive Industries*, v. 109, Aug. 1, 1953, p. 70-72.

Casting hulls and turrets for an Army tank. Photographs. (E general, CI)

492-E. Application of Electric Heat in Grey-Iron Foundries. G. Keller. *Brown Boveri Review*, v. 39, Nov./Dec. 1952, p. 403-409.

Applications. Compares relative economies of electric and fuel-fired furnaces. Photographs. (E10, CI)

493-E. Radio-Frequency Heating Of Foundry Cores. H. E. Schoch. *Brown Boveri Review*, v. 39, Nov./Dec. 1952, p. 421-425.

Present conventional methods for drying foundry cores and basic principles of radio-frequency heating. Advantages in drying of foundry cores in conjunction with the new synthetic resin binders. Photographs. (E21)

494-E. Modern Arc Melting Furnace Plant Features Swivelling Roof for Rapid Top Charging. R. Lambert. *Brown Boveri Review*, v. 39, Nov./Dec. 1952, p. 429-435.

Equipment in a Belgian foundry. Photographs, diagrams. (E10)

495-E. Pelleted Foundry Pitch. E. Brett Davies, T. F. N. Matthews, and G. Smart. *Foundry Trade Journal*, v. 95, July 30, 1953, p. 151-156.

British applications of pitch for foundry purposes. Tables, graphs, photographs. (E general)

496-E. Rules Can Be Broken: Zinc Die Castings Don't Always Cost More. *SAE Journal*, v. 61, Aug. 1953, p. 78-79.

Based on paper "What Alloy Should Be Used to Die Cast Decorative Automotive Parts—Zn, Al or Mg?" by M. R. Caldwell and C. Pack presented at SAE National Passenger-Car, Body and Materials Meeting, Mar. 4, 1953. Comparative finishing operations, design, melting points and production rates.
(E13, Zn, Al, Mg)

497-E. (German.) **Is Capital Needed for Rationalizing?** H. Krippendorff. *Giesserei*, v. 40, no. 14, July 9, 1953, p. 349-354.

Need and ways for planning and increasing production yields in foundry practice. Exchanges of experience between foundries are recommended. (E general)

498-E. (German.) **Casting a Complex Centrifuge Base.** H. Seifert. *Giesserei*, v. 40, no. 14, July 9, 1953, p. 364-367.

Process using two skeletal models and utmost skill of operator. Photographs, diagrams. 3 refs.
(E17, CI)

499-E. (Swedish.) **Rationalizing Without Large Capital Investment.** C. G. Söderlund. *Gjuteriet*, v. 43, no. 6, June 1953, p. 103-107.

Effects of the degree of mechanization on production per hour and on cost of production in the author's foundry. Tables, graphs.
(E general)

F

Primary Mechanical Working

207-F. The Magnet Amplifier in Control Circuits. R. W. Moore. *Iron and Steel Engineer,* v. 30, July 1953, p. 67-73.

Design of the amplifier, and its application in the rolling mill. Photographs, diagrams, graphs. (F23)

208-F. High Speed Mills and Their Application to Ferrous and Non-Ferrous Rolling. George Perrault, Jr. *Iron and Steel Engineer,* v. 30, July 1953, p. 83-89; disc., p. 89-91.

Typical mills show that increased speeds are justified. Diagrams, photographs. (F23, Fe, EG-a)

209-F. Rolling Mill Yield. Leo R. Silliman. *Iron and Steel Engineer,* v. 30, July 1953, p. 103-109; disc., p. 109-110.

How fundamental practices affect billet and bar yields. Photographs, graphs. (F23, CN, AY)

210-F. Forging Capacity of Hammers. *Metal Treatment and Drop Forging,* v. 20, July 1953, p. 310-312. (Translated and abridged from "The Use of Lead Cylinders to Determine the Energy of Forge Hammer Blows", K. Lange, *Werkstattstechnik und Maschinenbau,* v. 42, Nov. 1952, p. 464-468.)

Includes graphs. (F22)

211-F. German Experience Aids U. S. Artillery Shell Forgers. W. Trinks. *Steel Processing,* v. 39, July 1953, p. 340-344.

Causes of various defects in hot forged shells. How U. S. investigations are substantiated by German reports. Photographs. (F22, ST)

212-F. Baldwin Builds World's Largest Split Die Forging Press. *Welding Journal,* v. 32, July 1953, p. 622-624.

Specifications of the press. Photographs. (F22)

213-F. (French.) Foil Rolling Mills at Rugles, and Finishing at Dijon Plant of the Wire and Rolling Mill Co. of Havre. G. Francillard. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 147-153.

Production of Al foil in large widths containing very fine helio prints in five colors. Photographs. (F23, Al)

214-F. (German.) Graphic Method for Design in Drawing Pipes. A. Geleji and J. Schey. *Acta Technica Academiae Scientiarum Hungaricae,* v. 4, nos. 1-4, 1952, p. 347-363.

Graphic method by which pipe dimensions and drawing forces can be determined for each stage of the process. Drawings, graphs, nomograms. 6 ref. (F26)

215-F. (German.) New Five-Pass, Nongliding Multiple Wiredrawing Machine With Back Tension. *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 919-921.

Diagrams, photographs. (F28)

216-F. (German.) Inductive Ingot Heating With Power-Supply Frequency. Eduard K. L. Haffner. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 272-273.

Furnace for such heating. Photographs. (F21)

217-F. (Russian.) Possibility of Extensive Use of Magnesium Forgings in Mechanical Engineering. S. I. Gubkin, S. S. Volkov, and L. N. Moguchii. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 5, Oct. 11, 1952, p. 929-931.

Pecularities of the deformation of Mg and Mg alloys. Practical applications. 7 ref. (F22, Mg)

218-F. (Russian.) Adaptation of New Economical Rolled Shapes. V. Severdenko. *Za Ekonomiiu Materialov,* no. 3, Oct. 1952, p. 29-35.

Use of special rolled shapes in place of forgings. (F23, ST)

219-F. Mill Speeds Rolling of Thin Copper Strip. Edward C. Allen. *Iron Age,* v. 172, August 6, 1953, p. 143-145.

Machinery for rolling Cu and characteristics of finished product. Diagram, photographs. (F23, Cu)

220-F. (French.) The Mill of Central Corporation for Light Alloys. Marcel Lamourdedieu. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 101-107.

Operation and output of a rolling mill and extrusion plant at Issoire. Photographs, diagrams. (F23, F24, Al)

221-F. (French.) Variation of Speed in Cold Strip Rolling. *Métallurgie et la Construction Mécanique,* v. 85, no. 2, Feb. 1953, p. 120-121, 123.

With respect to controlled and independent rolling mills. Photographs. (F23)

222-F. (French.) Theory and Practice of Automatic Looping in Rolling Mills. Abel Beneteau. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 229-247.

Conditions under which a loop is formed in roll bars between two stands of rolls in a continuous mill. Diagrams. (F23)

223-F. (Hungarian.) The Rolling of Magnesium and Its Alloys. Laszlo Jakoby and Gyula Emod. *Aluminium,* v. 4, no. 7, July 1952, p. 145-151.

Melting and casting of Mg alloys suitable for rolling; effect and elimination of impurities; crystal structure; and effect of various heat treatments. Tables, graphs. 26 ref. (F23, C general, M26, J general, Mg)

224-F. Shell Forging and Heat Treating. Arthur Q. Smith. *Industrial Heating,* v. 20, Aug. 1953, p. 1514, 1516, 1518, 1520, 1522.

Furnaces for forging and heat treatment of shells. (F22, J general)

225-F. Lubrication in Metal Working. A. L. H. Perry. *Metallurgia,* v. 48, no. 285, July 1953, p. 3-10.

Types, nature and capacities of the main lubricants used in chipless forming and cutting operations. Discussion on testing and evaluating lubricants. Graphs, tables. (F1)

226-F. (Book.) Tube Mill Practice. 194 p. Association of Iron & Steel Engineers, Empire Bldg., Pittsburgh 22, Pa. $4.00.

Presents 23 articles compiled from *Iron and Steel Engineers.* Operating information and discussions. (F26)

G

Secondary Mechanical Working

262-G. Know Your Terminology for Drawn Shells. I. Stanley R. Cope. *American Machinist,* v. 97, Aug. 3, 1953, p. 110-113.

Types of shells; differentiates between drawing and redrawing operations. Considers stainless steel, brass, Al, Cu, Zn, Ni, and Mg. Diagrams. (To be continued.) (G4, Mg, Cu, Al, Zn, Ni, SS)

263-G. How Sharp Are Carbide Tools Finished With Silicon Carbides? John C. Redmond. *American Machinist,* v. 97, Aug. 3, 1953, p. 120.

Compares cutting edge of diamond and Si carbide grinding wheels. Micrographs. (G18, C)

264-G. Time for Drilling Mild Steel. V. G. Hotchkiss. *American Machinist,* v. 97, Aug. 3, 1953, p. 149.

Data sheet. (G17, CN)

265-G. A Case for Coated Abrasives. *Canadian Metals,* v. 16, July 1953, p. 48, 50-51.

Types of abrasives, backings, adhesives and wheels versus belt. Diagrams. (G18)

266-G. Fabricating the Steel Television "Tube". Arnold Hildebrandt. *Finish,* v. 10, Aug. 1953, p. 29-31, 74.

Combination of "automatic" metal spinning and press operations. Photographs. (G13, G1)

267-G. New Optical Layout System Minimizes Fabrication Problems. *Industry & Welding,* v. 26, Aug. 1953, p. 44-45, 47-48, 51.

New method permitting optical projection of scale drawings directly and in full size on the material to be fabricated. (G general)

268-G. Precision Cold Drawing of Small Sections. *Machinery* (London), v. 83, July 17, 1953, p. 99-107.

Examples showing extent to which process is being applied. Diagrams, photographs. (G4)

269-G. Reducing Machining Times by the Use of Carbon Dioxide Coolant. E. W. Bartle. *Machinery* (London), v. 83, July 24, 1953, p. 172-174.

Procedure and use of coolant. Photographs. (G17, G21)

270-G. Factors That Cause Defective Rolled Threads. *Metal Working,* v. 9, Aug. 1953, p. 20-21.

Tabulated information. (G12)

271-G. Peelable Plastic Coatings in the Stamping Plant. *Modern Industrial "Press",* v. 15, July 1953, p. 6, 8, 10.

Uses of plastic films to protect metals during fabrication. Photographs. (G3)

272-G. Specialists in Stainless Steel Fabrication. Howard E. Jackson. *Modern Industrial "Press",* v. 15, July 1953, p. 13-14, 16, 18, 22.

Production of sinks, drainboards, counters, work tables, cabinets, and lockers. Photographs. (G general, SS)

273-G. Titanium—a New Metal for Stampers to Watch. *Modern Industrial "Press",* v. 15, July 1953, p. 46, 48, 50, 56.

General data on supply, production, properties, and uses. Photographs. (G3, Ti)

274-G. Producing High Speed Turbine Wheels. Gilbert C. Close. *Modern Machine Shop,* v. 26, Aug. 1953, p. 114-119.

Extruding and profiling methods for manufacturing tiny turbine wheels for aircraft. Photographs. (G5, G17)

275-G. Two Giants for Tool Up. *Steel,* v. 133, Aug. 3, 1953, p. 102.

2000-ton hydraulic press and 36 ft. plate planer. Photographs. (G1, G17)

276-G. Radial Forming by Ryan. *Steel Processing,* v. 39, July 1953, p. 324-326.

An expanding mandrel which quickly and efficiently shapes stainless steel and Al contoured closed sections. Photographs. (G9, Al, SS)

277-G. Station Stops for Progressive Dies Reduce Waste. Federico Strasser. *Tool Engineer,* v. 31, Aug. 1953, p. 65-67.

Stops with and without springs. Diagrams. (G1)

278-G. Riverbank Ordnance Site Now Has Giant Presses. Wilbur D. Russell. *Western Machinery and Steel World*, v. 44, July 1953, p. 74-77.

Reconversion program for large-scale production of 105 and 155-mm. steel shell cases. Photographs. (G1, ST)

279-G. Bolts for the Aircraft Industry. Russell H. Bennett. *Western Machinery and Steel World*, v. 44, July 1953, p. 92-94.

Production of bolts. Illustrated. (G10, G17, K13)

280-G. On the Temperature Developed at the Shear Plane in the Metal Cutting Process. Robert S. Hahn. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 661-666.

By the use of the theory of heat conduction from sources and sinks, an analysis is made of the temperature distribution on the shear plane. Analytical results are presented in graphical form in terms of dimensional factors. Experimental determinations of chip temperatures from actual cutting tests are presented. Graphs. 8 ref. (G17, Al, Cu, ST)

281-G. (German.) **Extrusion and Punching Method.** A. Geleji. *Acta Technical Academiae Scientiarum Hungariae*, v. 4, nos. 1-4, 1952, p. 273-292.

Theoretical analysis of stresses and pressures. Micrographs, graphs, drawings. 13 ref. (G2, G5)

282-G. (Russian.) **Designing Templates for Gas Cutting Machines.** V. A. Toropov. *Avtogennoe Delo*, v. 23, no. 6, June 1952, p. 19-21.

Forms of templates. Three examples. Diagrams. (G22)

283-G. (Russian.) **Material and Heat Balance of Trimming and Cutting Low-Carbon Steel With Oxygen.** A. K. Nimburt. *Avtogennoe Delo*, v. 23, no. 10, Oct. 1952, p. 1-5.

Slags formed as a result of oxygen cutting. Correlation between slag composition and the heat requirements. Tables, graphs. 7 ref. (G22, CN)

284-G. (Russian.) **Machinability of High Speed Steel.** E. I. Feldshtein. *Stanki i Instrument*, v. 24, no. 1, Jan. 1953, p. 29-30.

Experiment and results. Highest cutting speed was obtained for a structure of granular pearlite and fine, uniformly distributed carbides. (G17, TS)

285-G. On the Mechanics of Cutting Metal Strips With Knife-Edged Tools. R. Hill. *Journal of the Mechanics and Physics of Solids*, v. 1, July 1953, p. 265-270.

Details of deformation, load variation, expenditure of work and influences of friction and hardening. Tables, diagrams. 5 ref. (G17, ST)

286-G. Which Metal Form. Spun or Drawn? John W. Lengbridge. *Materials & Methods*, v. 38, Aug. 1953, p. 87-91.

Adapted from a paper presented at the 1953 meeting of the American Society of Tool Engineers. Advantages and limitations of both processes. Diagrams, tables. (G4, G13)

287-G. (French.) **Details Relative to the Machining of Metals.** Pierre Sorin. *Comptes rendus*, v. 236, no. 25, June 22, 1953, p. 2406-2407.

"Self-machining" phenomena. (G17, Al)

288-G. (French.) **The Machinability of Stainless Steel.** J. Daurat. *Métallurgie et la Construction Mécanique*, v. 85, no. 3, Mar. 1953, p. 191, 193-195; no. 4, Apr. 1953, p. 275, 277, 279, 281; no. 5, May 1953, p. 387, 389; no. 6, June 1953, p. 487-489.

Drilling and tapping operations and methods for grinding and machining of various Cr, Ni, and other steels. Tables, diagrams. (To be continued) (G17, G18, SS)

289-G. (French.) **Recent Findings on Earing During Aluminum Drawing. The Possibility of Suppressing It.** H. A. J. Stelljes. *Revue de Metallurgie*, v. 50, no. 3, Mar. 1953, p. 189-198; disc., p. 198.

Investigations undertaken in France, Germany and Switzerland. Diagrams, photographs, tables. (G4, Al)

290-G. (French.) **Present Tendencies in Metal Cutting.** F. Jamar. *Revue universelle des mines*, v. 9, ser. 9, no. 4, Apr. 1953, p. 196-204.

Development, limits, and tendencies of machine tools in peripheral milling with the aid of high-speed steel tools. Graphs, diagrams. 20 ref. (G17, TS)

291-G. (German.) **Grinding and Polishing Aluminum.** W. Burkart. *Aluminium*, v. 29, no. 5, May 1953, p. 198-200.

Working conditions and numerous faults. Photographs. 10 ref. (G19, L10, Al)

292-G. (Hungarian.) **Deep-Drawing Tests of Aluminum Plate With High Iron Content and Alloyed With Manganese.** György Hamos. *Aluminium*, v. 5, no. 4, April, 1953, p. 73-77.

Reports on series of tests. Results are compared with those of better Al alloys. Possibilities of practical application for above type Al alloys. Tables, graphs, photograph. (G4, Al)

293-G. Cutting Oils and Their Uses. *Australasian Engineer*, May 7, 1953, p. 95-98.

Correct use of soluble and straight cutting oils. (G21)

294-G. Recent Developments in Powder Processes. *Canadian Metals*, v. 16, July 1953, p. 42-44, 46-47.

Powder washing, cutting, skull reduction and applications. (G22)

295-G. Aircraft Forming Gets a Lift. Donna M. Ohm. *SAE Journal*, v. 61, Aug. 1953, p. 80-83.

Report on Panel on Forming held at SAE Aircraft Production Forum, Los Angeles, Oct. 1, 1952. Six methods for better and cheaper formed parts from Al. Photographs. (G general, Al)

296-G. Thread and Form Rolling. III. Characteristics of Thread Form. IV. Blank Specifications for Proper Rolling. C. T. Appleton. *Screw Machine Engineering*, v. 14, May, 1953, p. 37-41; June, 1953, p. 44-49.

Part III: Smoothness, accuracy, uniformity, diameters, taper, thread angle, lead, drunkenness, and roundness. Part IV: Preparing blanks and effect of size on rolling. Diagrams. (G11, G12)

297-G. Some Observations on the Metallurgy of the Deep Drawing of Metals. D. V. Wilson. *Sheet Metal Industries*, v. 30, Aug. 1953, p. 621-629, 640.

Testing of drawing capacity, lubrication, and properties required in the finished component. Micrographs, photographs, graphs, diagrams. 8 ref. (G4)

298-G. Coating Halts High Coining Costs. *Steel*, v. 133, Aug. 10, 1953, p. 102.

Use of phosphate coating on blanks to prevent press breakdown. Photograph. (G3)

299-G. Line Grinding Solves Cutting Problems. H. J. Chamberland. *Steel*, v. 133, Aug. 17, 1953, p. 114, 117.

Technique of line grinding with a band machine. Photographs, diagram. (G18)

300-G. (Book.) **Copper and Brass Pressings.** Rev. ed. 81 p. Copper Development Assoc., Kendals Hall, Radlett, Herts, England.

Principal processes employed in the manufacture of strip and sheet products. Includes shearing; cupping; redrawing; miscellaneous pressing operations; expanding and contracting; bending and folding; coining; forming by flexible tools; spinning; joining and annealing; heat treatment; and pickling. Gives mechanical properties and composition of Cu and Cu alloy strip and sheet. (G general, J general, K general, L12, Q general, Cu)

H
Powder Metallurgy

77-H. Magnetization Curves of Powdered Iron. A. D. Franklin. *Franklin Institute, Journal*, v. 256, July 1953, p. 90-92.

Study on the way in which the intensity of magnetization approaches saturation in high fields for this type material. Graph. (H11, Fe)

78-H. New Process Gives Unusual Powder Parts. H. J. Hamjian and F. N. Darmara. *Iron Age*, v. 172, July 30, 1953, p. 98-100.

Use of C, Ti, and Zr to form complex parts. Photographs. (H general, C, Ti, Zr)

79-H. An Understanding of Cemented Tungsten Carbides and Their Applications in Mining. A. F. Dobbrodt. *Mines Magazine*, v. 43, July 1953, p. 13-14, 30.

Photographs. (H general, T28)

80-H. New Magnetic Materials of High Coercivity. L. F. Bates. *Nature*, v. 172, July 18, 1953, p. 97.

Production and properties of permanent magnets. 4 ref. (H general, P16, Fe, Ni, Co, Al, Cu, Ag, SG-n)

81-H. Longer Service Life Obtained From Powdered Metal Parts. *Precision Metal Molding*, v. 11, Aug. 1953, p. 27, 68.

Properties and characteristics of powdered metal parts. (H general)

82-H. High Frequency Cores. An Important Use for Powdered Iron. Richard D. Ponemon. *Precision Metal Molding*, v. 11, Aug. 1953, p. 30-32, 74-80.

Production of the cores. Photographs. (H general, P15, Fe, SG-q)

83-H. (French.) **The Manufacture of Self-Lubricating Bearings. Sintering in the Presence of a Liquid Phase.** P. Laurent and M. Eudier. *Revue de Metallurgie*, v. 50, no. 6, June 1953, p. 382-388.

Difficulties arising from the presence of a liquid phase during passage through a furnace. Graphs, photographs. 9 ref. (H15, Cu, Fe)

84-H. (English.) **Some Observations on the Mechanism of Liquid Phase Sintering.** H. S. Cannon and F. V. Lenel. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 106-121; disc., p.121-122.

Provides better understanding of the mechanism of the sintering process. Explains rate of densification and the manner in which variables affect this rate. Micrographs, graphs. (H15)

85-H. (English.) **The Development of High-Strength, Heat Treatable Products From Alloy Powders.** G. J. Comstock and F. H. Clark. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 123-139.

Powder metallurgy process and materials which can be produced. Considers Fe, brass, Al, Cu, and nickel silver. Graphs, diagrams, micrographs, tables.
(H general, Fe, Cu, Al, Ni, Zn)

86-H. (English.) **The Effect of Lattice Changes on the Sintering Process.** H. H. Hausner. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 146-155; disc., p. 155-156.

Initial phases of the H_2 reduction of oxide films and effect of Zr hydride decomposition during sintering. Tables, micrographs.
(H15, M26, Zr)

87-H. (English.) **The Production of Metal Powders by Fusion Electrolysis.** W. J. Kroll. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 160-170.

Problems of cell construction and the electrolyte; soluble and insoluble anodes; and continuous or semicontinuous electrolysis. Ti, W, Mo, and Mn are used as examples. Diagrams. (H10, Ti, W, Mo, Mn)

88-H. (English.) **Powder Metallurgy as Viewed by a Manufacturer of Metal Powder Products.** A. J. Langhammer. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 171-174.

Advantages of powder metallurgy.
(H general)

89-H. (German.) **Influencing the Sintering Properties of Metallic Powders by Surface Treatment.** Gerhard Naeser and Hans Burmeister. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, May-June 1953, p. 251-255.

Possible improvement of parts by the process. Graphs, tables. 21 ref.
(H15)

90-H. (German.) **Contemporary Views on the Nature of Metals and Its Importance for Metal Ceramics (Powder Metallurgy).** F. Skaupy. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 81-87; disc., p. 88.

Nature of metals with special attention to interatomic distances and properties of thin layers. Concepts are applied to some problems of powder metallurgy. Graphs.
(H general, M25)

91-H. (German.) **Determination of Metal-Powder Adhesion.** E. Cremer. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 140-145; disc., p. 145.

Measurement of the glide angle of a powder dusted on a solid support permits the determination of "adhesive force". Value depends on surface properties of both powder and support and is inversely proportional to the particle diameter of the powder. Graphs, tables.
(H11)

92-H. (German.) **Micro-Hardness as an Expedient for Tests of Sinter-Processes in Complex Systems.** E. M. Onitsch-Modl. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 175-184; disc., p. 184-187.

Alloying process incurred during the sintering of Fe-C alloys which contain the carbide-forming elements Cr, W, Mo, and V observed by means of the micro-hardness test. Applications and limits of test. Micrographs, graphs. 11 ref.
(H15, Q29, Fe, Cr, W, Mo, V)

93-H. (German.) **A Contribution to the Physical Analysis of the Sintering Process.** G. Ritzau. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 188-198.

Principles of the method for binary systems which exhibit either complete mutual solubility (Cu-Ni) or complete mutual insolubility (Cu-Fe) in the solid as well as liquid states. Poor sintering performance of Ni is indicated by this analysis. For sintered hard metals and magnets it is shown that the method is capable of recording the course of sintering in complex alloys. Graphs, micrographs. (H15, Cu, Ni, Fe)

94-H. (German.) **The Surface Layers, Particularly Oxide, and Their Influence on Sintering.** F. Sauerwald. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 199-202.

Factors responsible for the stability of oxide films on Cu. Effect of stable and unstable oxide films on the mechanical strength of sintered Cu compacts. Graphs.
(H15, Q23, Cu)

95-H. (German.) **The Application of Tracer Method in Powder Metallurgy.** H. Schreiner. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 203-209; disc., p. 210.

Various means whereby specimens like metal powder, press and sinter compacts may be made radioactive. It is possible to obtain kinetics of sintering at a constant temperature of sintering. Sinter curves of pure metals, e.g. Fe and Cu. Graphs. (H15, S19, Fe, Cu)

96-H. (German.) **New Development in Aluminum Powder Metallurgy.** A. von Zeerleder. Paper from "Plansee Proceedings 1952." Metallwerk Plansee Ges. M. B. H., p. 211-219; disc., p. 219-220.

SAP process for producing Al powder. Micrographs, tables, graphs. (H10, Al)

97-H. (German.) **Production of Pure Titanium Carbide.** G. F. Hüttig. Paper from "Plansee Proceedings 1952". Metallwerk Plansee Ges. M. B. H., p. 259-267; disc., p. 267.

Shows that chemical composition should correspond to the chemical formula, free-carbon content should be as low as possible, and particle size distribution should be within certain limits. Tables. (H10, Ti, C)

98-H. (Hungarian.) **Sintered Copper-Aluminum Connectors.** Endre Bohner and Jozsef Lukacs. *Electrotechnika*, v. 46, no. 3, Mar. 1953, p. 81-86.

Manufacture, control tests and use to connect Al and Cu wires. Diagrams, micrographs.
(H general, T1, Cu, Al)

99-H. (Russian.) **An Experiment on the Application of Steel Powder From Grinding Waste.** V. I. Melnik. *Avtogennoe Delo*, v. 23, no. 6, June 1952, p. 17-19.

Mechanical and demagnetizing treatment of powders. Use for electrode coatings. (H general, ST)

100-H. (Russian.) **Determination of the True Specific Surface of Hard Dispersoids by Air Permeability.** T. A. Zavaritskaia and V. N. Grigarov. *Doklady Akademii Nauk SSSR*, v. 86, new ser. no. 4, Oct. 1, 1952, p. 757-758.

Data on Al and polystyrol powders. Tables. 3 ref. (H11, Al)

101-H. Powder Metallurgy. E. E. Rooste. *Australasian Engineer*, June 8, 1953, p. 62-69, 121.

Principal applications of powder metallurgy to the manufacture of W lamp filaments, Mo wires, processing Ta and Cb, production of electric motor brushes, porous bearing, sintered "Alnico", electrical contact alloys, and the manufacture of WC products. Photographs, photomicrographs. 33 ref.
(H general, T general)

102-H. Sintered Titanium Carbides Open New Industrial Horizons. John W. Graham. *Iron Age*, v. 172, Aug. 13, 1953, p. 148-152.

Uses and advantages of Ti carbides sintered with Ni, Co and Fe-base alloys. Photographs, graphs.
(H15, T general, Ti, Ni, Co, Fe)

103-H. Reducing Costs by the Application of Powder Metallurgy. *Machinery (London)*, v. 83, July 31, 1953, p. 213-214.

Successful application of the process. Photographs. (H general)

104-H. Granular Powders for Powder-Metallurgical Applications. *Materials & Methods*, v. 38, Aug. 1953, p. 127, 129, 131.

Tabulated information. (H10)

105-H. Cemented Chrome Carbides. J. D. Kennedy. *Product Engineering*, v. 24, Aug. 1953, p. 154-157.

Physical and mechanical properties, finishing and joining techniques and suggested uses. (H general, Cr)

106-H. (Book.) **Plansee Proceedings 1952.** F. Benesovsky, editor. 316 p. 1953. Metallwerk Plansee G.m.b.H., Reutte/Tyrol.

Contains 29 papers presented at the First Plansee Seminar "De Re Metallica" held June 22-26, 1952, in Reutte/Tyrol. Papers are abstracted separately. (H general, Q general)

J
Heat Treatment

167-J. A High-Frequency Bar Stock Hardening Machine. *Engineer*, v. 196, July 17, 1953, p. 88.

Apparatus designed for surface hardening of steel bars. (J28, CN)

168-J. Heat Treating by Prescription. Cornelius Ackerson. *Industrial Gas*, v. 32, July 1953, p. 14-15, 25, 27.

Modern equipment used in heat treating. Photographs.
(J general, Cu, Ag)

169-J. Developments in Induction Heating. New Efco Works at Burton-on-Trent. *Metal Treatment and Drop Forging*, v. 20, July 1953, p. 325-326.

Heat treating layout and equipment. (J2)

170-J. Gas Heat Anneals and Brazes Connectors. *Metal Working*, v. 9, Aug. 1953, p. 8-9.

Selection of burners to provide efficiency and economy. Photographs. (J23, K8)

171-J. Heat Treatment of Steel. Frank Bowman. *Mines Magazine*, v. 43, May 1953, p. 23-24, 32.

General reviews. (J general, ST)

172-J. No Waiting in This Long Line. *Steel*, v. 133, Aug. 3, 1953, p. 124-125.

Layout of 365-ft. annealing line. Diagram. (J23)

173-J. Industrial Furnace Design and Application. I.-II. Lester F. Spencer. *Steel Processing*, v. 39, June 1953, p. 286-295; July 1953, p. 345-348.

Factors to be considered in selecting a furnace. Different types available. Photographs. (J general)

174-J. Pack Carburizing Aspects and Developments. I. John E. Hyler. *Steel Processing*, v. 39, July 1953, p. 335-339, 349.

Investment in furnace equipment; development of carburizing compounds; repeated use of compounds; advantages of peach-pit compounds; catalysts; importance of weight and moisture; screening and cleaning compounds; carburizing pots and boxes; and container sizes and shapes. (J28)

175-J. (German.) **Annealing Low-Carbon Cold Rolled Strip Steel in the Continuous Heat Treating Furnace.** Karl-Heinrich Muhr and Anton Pomp. *Stahl und Eisen*, v. 73, no. 14, July 2, 1953, p. 885-894.

Effects of different degrees of cold rolling, temperature and time of annealing, and rate of cooling on

seven different steels investigated by tensile and drawing tests and by metallographic and X-ray studies. Tables, graphs, photographs. 60 ref. (J23, Q23, M general, CN)

176-J. (German.) **Critical Comparison of the Heat Treating Equipment in Cold Rolling Mills.** Erich Schauff. *Stahl und Eisen*, v. 73, no. 14, July 2, 1953, p. 895-902.

Properties and basic problems of heat treating low-carbon strip steel. Advantages and disadvantages of different types of heat treating furnaces. Tables, graphs, diagrams, photographs. (J general, ST)

177-J. (Russian.) **End Heating of Bars With a Stationary Flame of Multi-Row Burners.** N. N. Rykalin and M. Kh. Shorshorov. *Avtogennoe Delo*, v. 23, no. 6, June 1952, p. 1-6.

Results of study on steel bar heating. Methods of calculation of heating and cooling processes. Photographs, graphs, tables. 4 ref. (J2, ST)

178-J. (Russian.) **Continuous Tempering of Steel Strip Without Surface Oxidation.** E. Z. Ermolchenko and M. G. Rabovskii. *Promyshlennaia Energetika*, v. 9, no. 10, Oct. 1952, p. 7-8.

Furnaces and handling equipment. (J29, ST)

179-J. (Russian.) **Patenting of Steel Wire in Salt and Alkali Baths.** A. Zatev. *Za Ekonomiiu Materialov*, no. 4, Nov. 1952, p. 74-76.

Production data shows that temperature of salt baths should be 50-70° higher when used as a substitute for Pb baths. (J25, ST) eral, L12, Q general, Cu)

180-J. Flux Annealing Removes Gas From Aluminum-Clad Plates. E. J. Boyle. *Iron Age*, v. 172, Aug. 13, 1953, p. 145-147.

Blistering of Al-clad plates caused by H_2 precipitation when heated at 1100° F. can be prevented by flux annealing. Treatment consists of dipping in alcohol slurry of halide Al brazing flux, drying at 300° F., and heating for 1 hr. at 1100° F. Tables, micrographs. (J23, Al)

181-J. Heat Treating Gears to Meet Rigid Requirements. Ralph Spagnola. *Materials & Methods*, v. 38, Aug. 1953, p. 102-103.

How careful control of carburizing and subsequent heat treatment yields gears with optimum case and core properties. Photographs. (J28)

182-J. (French.) **Martensite Tempering. (Interrupted Martensite Tempering).** R. F. Harvey. *Métallurgie et la Construction Mécanique*, v. 85, no. 6, June 1953, p. 483-485.

History of the process, its theoretical conception and its progressive use in industry. Graph. 8 ref. (J29, ST)

183-J. (French.) **Observations on the Firing of Metallurgical Furnaces by Mazut.** Georges Cain. *Métallurgie et la Construction Mécanique*, v. 85, no. 6, June 1953, p. 495, 505.

Advantages of heavy oil furnace firing. Photographs. (J general, F1)

184-J. (French.) **Contributions to the Study of Cast Irons With Spheroidal Graphite and Their Applications.** Cornelio Gianola. *Revue de Metallurgie*, v. 50, no. 3, Mar. 1953, p. 199-206.

Influence of heat treatment conditions on the morphology of the spheroids of graphite and the properties of the matrix. Photographs, tables. (J general, CI)

185-J. Gear Hardening by the Induction Method. *Australasian Engineer*, May 7, 1953, p. 89, 91, 93.

High-frequency induction heating. (J2)

186-J. Annealing and Melting With Low-Frequency Induction Heating. K. Frauenfelder. *Brown Boveri Review*, v. 39, Nov.-Dec., 1952, p. 410-420.

Field of low-frequency induction heating in general and some of the latest equipment. Diagrams, graphs, photographs. (J2, D6)

187-J. A New Electric Car-Hearth Furnace for Stress-Relieving Grey Iron Castings and Annealing Ductile Cast Iron. G. Steiner. *Brown Boveri Review*, v. 39, Nov./Dec. 1952, p. 425-428.

Constructional features of a new dual-purpose car-hearth furnace. Diagrams. (J1, CI)

188-J. Electric Heat Treatment Installations. F. Treichler. *Brown Boveri Review*, v. 39, Nov./Dec. 1952, p. 442-451.

Various methods of heat treating tool and other steels as well as the practical requirements which have to be met in the selection of furnaces. Layout of heat treatment installations. Photographs. (J general, TS, ST)

189-J. Clean Normalizing of Welded Tubing at Ford Mound Road Plant. *Industrial Heating*, v. 20, Aug. 1953, p. 1472-1474, 1476, 1478, 1638, 1640.

Normalizing process and equipment. Photographs. (J24)

190-J. An Evaluation of the Hardening Power of Quenching Media for Steel. I. Earl J. Eckel, Ross M. Mayfield, Glen W. Wenscn, and Frank A. Rough. *Industrial Heating*, v. 20, Aug. 1953, p. 1482-1484, 1486, 1488.

Relative hardening powers of various quenchants in the critical temperature ranges. Table, graphs. (J2)

191-J. Influence of Heat Treatment on the Properties of Drawn Steel Wire. Hermann Weil. *Wire and Wire Products*, v. 28, Aug. 1953, p. 788-790, 819-827.

Translated by Jerome W. Howe from Nov. and Dec. issues of *Draht-Welt*. Tables, graphs, micrographs. (J general, CN, ST)

192-J. (Dutch.) **The Hardness and Toughness of Steels as Functions of the Hardening and Tempering Temperature.** F. H. Willeumier. *Metalen*, v. 8, no. 12, June 1953, p. 251-255.

Effects of hardening temperature and C content on the relationship between the toughness and hardness of various steels. Tables, graphs. 5 ref. (Concluded.) (J26, J29, Q29, Q23, ST)

193-J. (French.) **The Various Industrial Phenomena of Steel Hardening.** A. Portevin. *Metalen*, v. 8, no. 12, June 1953, p. 247-250.

Mechanism of austenite-martensite transformation and the effects of various alloying elements on the hardening of steel. Graphs. (To be continued.) (J26, N8, AY)

194-J. (Book—French.) **(Heat Treatment Practice for Industrial Metals.) La Pratique des Traitements Thermiques des Metaux Industriels. Ed. 4.** Gerard de Smet. 405 p. 1953. Dunod, Paris.

Discusses heat treatment of both ferrous and nonferrous metals. (J general)

K

Joining

455-K. Welding Copper and Copper Alloys. Warren Coulter. *Canadian Metals*, v. 16, June 1953, p. 52, 54; July 1953, p. 34, 36.

Part I: Problems met in welding Cu, allowances for properties, and methods of welding including oxy-acetylene, electric arc, and metallic arc. Part II: W arc shielded with inert gas, cold working, and importance of P. Photographs. (K2, K1, Cu, W, P)

456-K. Procedures for Welded Construction of Special Machinery Frames. *Industry & Welding*, v. 26, Aug. 1953, p. 37-40.

Pressures, amperage edge preparation, choice of electrodes, and design of positioners. Photographs. (K1, CN)

457-K. Nickel-Molybdenum Welding Repairs Defects in New Casting. *Industry & Welding*, v. 26, Aug. 1953, p. 42.

Procedure. Photographs. (K general, Ni, Mo)

458-K. Inert Arc Weld High Carbon Steel With Stainless Filler Wire. *Industry & Welding*, v. 26, Aug. 1953, p. 53, 79.

Process. Photographs. (K1, CN)

459-K. You Can Use Furnace Brazing for Ductile, High Strength Joints. L. Jacobsmeyer. *Industry & Welding*, v. 26, Aug. 1953, p. 54-56, 58.

Cu and Ag brazing. Photographs, diagrams, photomicrographs. (K8, Cu, Ag)

460-K. Up-to-Date Comparison Chart for Low Hydrogen Electrodes. *Industry & Welding*, v. 26, Aug. 1953, p. 60-61.

Comparative information on low-hydrogen electrodes now available. Table. (K1, Ni, Mo, Mn, V)

461-K. Oxy-Acetylene Welding Pays Dividends in Mill Maintenance Work. *Industry & Welding*, v. 26, Aug. 1953, p. 62-64, 66, 68-69.

Equipment and use of oxy-acetylene welding. Photographs. (K2)

462-K. Resistance Welding Cuts Tooling Costs 75 Percent. *Industry & Welding*, v. 26, Aug. 1953, p. 71-72, 74-75.

Savings; use for unusual appliances; elimination of custom tooling; and use of standard dies, assemblies and visual inspection. Photographs. (K3)

463-K. Short Cuts to Increased Shop Welding Efficiency. *Industry & Welding*, v. 26, Aug. 1953, p. 84-86, 88-89.

Photographs. (K general)

464-K. Welding Speed Quadrupled With Semiautomatic Methods. *Iron Age*, v. 172, July 30, 1953, p. 102-104.

Semi-automatic hidden arc welding methods, combined with welding positioners and turning rolls. Photographs. (K1)

465-K. Good Fixtures Expedite Arc Welding of Heavy Assemblies. William T. Potter. *Machine and Tool Blue Book*, v. 49, Aug. 1953, p. 155-160.

Features and advantages of welding fixtures. Photographs. (K1)

466-K. Modern Furnace Brazing Practice. I.-II. H. M. Webber. *Machine and Tool Blue Book*, v. 49, July 1953, p. 160-168, 172-173; Aug. 1953, p. 192-194, 196, 198, 200-206.

Principles and applications as well as comparative tests between brazing and machining given parts. Diagrams, photographs. 16 ref. (K8, G17)

467-K. Repairs to Blading of a Large Ventilating Fan. J. H. Dent. *Machinery Lloyd (Overseas Ed.)*, v. 25, July 18, 1953, p. 90-92.

Cause of fracture and welding repairs. (K general)

468-K. Precision Spot Welding Machine. *Machinery Lloyd (Overseas Ed.)*, v. 25, July 18, 1953, p. 101-102.

Equipment with respect to moveable electrode, welding pressure and timing. (K3)

469-K. Applying Welding to Ship Repairs. Sydney Swan. *Marine Engineering*, v. 58, Aug. 1953, p. 65-68.

Fracture problem, quality control, correct welding sequence and use of preheat. (K general, CN)

470-K. Brazing and Hard Soldering. *Mechanical World and Engineering Record*, v. 133, July 1953, p. 312.

General brazing materials. Diagram. (K8, K7, Cu, Zn, Ag, Ni)

471-K. Brazing Cemented Carbide Tips. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 315.
Method. Diagram. (K8)

472-K. Fully Mechanized Welding. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 324-325.
Machines used to increase production. Photographs. (K general)

473-K. Cylinder Head-Barrel Built Up by Welding Four Components. *Metal Working,* v. 9, Aug. 1953, p. 4-5.
How cast, forged and wrought steel elements are assembled to form parts for light marine diesel engine. Photographs. (K general, ST)

474-K. High Speed Welding of Non-Ferrous Tubing. *Modern Machine Shop,* v. 26, Aug. 1953, p. 210, 212, 214.
Method of induction welding. Photographs. (K6)

475-K. Inert Gas Doubly Shields Improved Pipe Welds. *Power,* v. 97, Aug. 1953, p. 94-97.
"K-Weld Process" which uses inert-gas shielded-arc welding to apply the initial bead. Same process, metal arc, or any acceptable fusion welding method, may be used to finish. Photographs. (K1)

476-K. Tanks Ride Rocking-Horse Weld Positioner. *Steel,* v. 133, Aug. 3, 1953, p. 140.
Operation of a rocking positioner for welders' use. Photographs. (K general)

477-K. Factors in the Selection of Welding Processes. John J. Chyle. *Welding Journal,* v. 32, July 1953, p. 585-596.
Use of eight welding processes and their characteristics. Tables, diagrams, photomicrographs. (K general)

478-K. Cone Arc Welding. P. Patriarca and G. M. Slaughter. *Welding Journal,* v. 32, July 1953, p. 597-602.
Evaluates the process by experiment. Diagram, photographs, photomacrographs. 5 ref. (K1, SS)

479-K. Resistance Welding Applications in Aircraft Stainless Steels. D. O. Samuelson. *Welding Journal,* v. 32, July 1953, p. 603-611.
Specific application of spot and seam welding to assemblies for airframe parts and engines. Information on equipment controls and procedures. Tables, photographs. (K3, SS)

480-K. Welding Design for High-Pressure Gas Compressor Bottles. Carl Wurgler. *Welding Journal,* v. 32, July 1953, p. 612-613.
Design to reduce pipe failures. Diagrams. (K general)

481-K. Provide for Expansion and Contraction. J. A. Fluharty. *Welding Journal,* v. 32, July 1953, p. 620-621.
In respect to welding. Diagrams, photographs. (K general, P11)

482-K. Welding Time on Minesweeper Stacks Cut in Half. *Welding Journal,* v. 32, July 1953, p. 624.
Technique. Photographs. (K general, Al, SS)

483-K. Joining of Copper by Use of Heliwelding. H. A. Huff, Jr. *Welding Journal,* v. 32, July 1953, p. 625-626.
Advantages. Photographs. (K1, Cu)

484-K. Rotating Electrode. *Welding Journal,* v. 32, July 1953, p. 630.
Apparatus and operations. Photograph. (K1, Cu)

485-K. Stud Welding Used in Farm Machinery. *Welding Journal,* v. 32, July 1953, p. 631-632.
Photographs. (K1)

486-K. Protect the Part During Welding. E. E. Olson. *Welding Journal,* v. 32, July 1953, p. 632.
Use of carbon back-ups as welding aid. Photographs. (K1)

487-K. Considerations of Welded Hatch Corner Design. *Welding Journal,* v. 32, July 1953, p. 316S-324S.
Hatch corner details, tests, and design principles. Diagrams. (K general)

488-K. Structural Failures in Welded Ships. *Welding Journal,* v. 32, July 1953, p. 342S-346S.
Critical role of brittleness of steel. Diagrams, photographs, tables. (K general, Q23, CN)

489-K. Copper in Type 347 Weld Metal. R. F. Wentworth. *Welding Journal,* v. 32, July 1953, p. 347S-351S.
Experiments on the suppression of sigma phase by Cu additions. Tables, graphs. (K general, Cu, SS)

490-K. The New Bridge Over the Rhine at Dusseldorf. *Welding Journal,* v. 32, July 1953, p. 352S.
Specifications for weld joints in shop fabrication. Diagrams. (K1, T26)

491-K. (Russian.) Production of Welded Bridges. D. P. Lebed. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 6-9.
Principles of welded bridge construction. Diagrams. 4 ref. (K general, T26, ST)

492-K. (Russian.) Transfer of Manganese Into Molten Metal During Manual Electric Arc Welding. E. D. Lonskii. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 9-13.
Granulometric composition of ferromanganese introduced into the coating may play an essential role in the transfer and chemical composition of the molten metal. Tables. (K1, Mn)

493-K. (Russian.) New Methods of Depositing Copper and Copper Alloys. N. M. Chelnokov. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 15-17.
Automatic carbon-metallic arc welding using rods and crushed chips. Diagrams, photographs. (K1, Cu)

494-K. (Russian.) Problem of Welding With a Cluster of Electrodes. N. Iu. Parfchuk, N. I. Makarov, M. G. Makeev, N. V. Brodovick, and M. I. Liber. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 24-32.
Optimum current and amount of weld material is smaller than for a single electrode. Quality of bead is the same. (K1, ST)

495-K. (Russian.) Strength of Spots and Electro-Rivets During Welding of NL-2 and St. 3 Steels. A. V. Obukhov, M. M. Kraichik, and E. A. Greil. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 7-10.
Advantages of using submerged arc electro-riveting. Photographs, diagrams, graphs, tables. 2 ref. (K1)

496-K. (Russian.) Calculation of the Magnetic Circuit of Spot Welding Machine at a Given Value of Power. O. N. Bratkova. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 10-12.
Magnetic circuit of a welding transformer for a given amount of energy. Graphs. (K3)

497-K. (Russian.) Spot Welding of Aluminum Alloys by Means of an Apparatus Which Utilizes Accumulated Kinetic Energy. S. V. Shablygin and B. V. Zhuravlev. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 12-14.
Expediency of welding Al alloys with a motor-generator apparatus. Experimental data. Photographs, graphs. 2 ref. (K3)

498-K. (Russian.) Method of Welding Using Submerged Arc Electro-Riveting With Electrode Feeder. N. I. Kakhovskii. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 18-22.
Considered to be very economical and to guarantee high durability. Graphs, tables, photographs, diagrams. 5 ref. (K1, CN)

499-K. (Russian.) Machine for Automatic Welding. I. V. Voronin. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 22-24.
For building of excavator, road, chemical and transport machinery. Diagrams, photographs. (K1)

500-K. (Russian.) Reconditioning Cylinders of Horizontal Ammonia Compressors. K. Voshchanov. *Khodil'naia Tekhnika,* v. 29, no. 3, July-Sept. 1952, p. 24-28.
Welding of cracks in valve cross connections of compressors. Diagrams. (K general)

501-K. (Russian.) Facilitating the Forming of Shells During the Manufacture of Cylindrical Containers. S. A. Starikovich and Z. B. Knizhnik. *Promyshlennaia Energetika,* v. 9, no. 10, Oct. 1952, p. 17-19.
Fixture to aid in the arc welding of steel cotnainers. (K1, ST)

502-K. (Spanish.) Characteristics Necessary for Cables Used in Electric-Arc Welding. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 3 p.
Development of standards for welder cables. Tables. (K1)

503-K. (Spanish.) Designing Welded Constructions. F. Koenigsberger. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 12 p.
Mechanical properties of welded materials, economy in welding shop and welded joints and their strength. Diagrams, graphs, tables. (K general, Q general)

504-K. (Spanish.) Remarks on the Study of Fluxes. G. M. Blanc and B. H. Deglon. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 8 p.
Welding fluxes with respect to reduction and dissolution of oxides, melting point, density, viscosity, surface tension, solidification and other properties. 28 ref. (K1)

505-K. (Spanish.) Repairing an 86-Hp. Diesel Motor by Welding. D. F. Saceda. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 2 p.
Welding a defective cylinder head. Diagrams. (K general)

506-K. (Spanish.) System of Longitudinal Structure With Lapboards for the Construction of Welded Hulls. F. J. Bembibre. *Cienciay technica de la Soldadura,* v. 3, no. 11, Mar.-Apr. 1953, 16 p.
Method of constructing ship hulls using welding as the principal method of joining which results in savings in materials and costs. Diagrams, tables. (K general, T22)

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Physical-chemical processes that occur when metal is subjected to heat. Photographs, tables, graphs. (K9, Cu)

508-K. Nonferrous Tubing Smashes Speed Barrier. *Steel,* v. 133, Aug. 10, 1953, p. 146-148.
Process of high-speed induction welding. Diagram, photographs. (K6)

509-K. Ordinary Carbon or Low-Alloy Carbon-Manganese Structural Steels. *Institute of Welding, Transactions,* v. 16, June 1953, p. 77-79.
Minimum requirements for steels to be welded. (K9, CN, AY)

510-K. (French.) Welded Frames for Machine Tools. *Métallurgie et la Construction Mécanique,* v. 85, no. 4, Apr. 1953, p. 291, 293.
Recent progress in above field. Photographs. (K general, ST)

511-K. (French.) **Scientific Problem of Welded Joints.** F. Campus. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May, 1953, p. 213-217.

Studies particularly difficult welds. Formulas on the total shrinkage of butt welded joints. Weldability and brittle fracture with respect to the problem of fusion. 4 ref. (K9, Q26)

512-K. (French.) **Welding at the Service of the National Economy.** P. Goldschmidt. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 218-263.

Contribution of welding and associated techniques to the Belgium National economy as an element in production and construction. Photographs. (K general)

513-K. (French.) **Most Recent Progress in Resistance Welding.** A. C. Boland. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 263-268.

Progress in spot welding machines. Includes electrostatic and electromagnetic energy accumulation, frequency transfer, and d.c. and 3-phase machines. Diagrams. (K3)

514-K. (French.) **Results Produced With Bare Electrodes.** Willy Bonhomme. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 268-277.

Bare electrodes for arc welding with respect to technological and economical properties. (K1)

515-K. (French.) **Recent Progress in Welding, Repair, and Electric Arc Cutting.** F. Danhier. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 277-286.

Principal types of modern electrodes for steels and nonferrous metals. Includes automatic and oxy-acetylene welding. Photographs, charts.
(K1, K2, Ni, Cu, Cr, CN, AY, SS)

516-K. (French.) **Recent Progress in Blow Torch Welding, Oxy-Acetylene Welding, and Some Associated Techniques.** T. Courard. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953. p. 287-300.

Principal postwar advancements. Tables, diagrams, photographs. (K2)

517-K. (French.) **Inert-Gas Arc Welding.** S. H. M. Pirard. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 300-311.

Use of A arc for W electrode, fusible electrode and spot welding processes. (K1, K3)

518-K. (French.) **Determining Weld Dimensions in Naval Construction.** H. E. Jaeger. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 312-319.

Indications for calculating strength of welded joints in naval construction with the creep limit being taken as a basis. Residual stresses. Tables, charts. 13 ref. (K9, Q3)

519-K. (French.) **Some Belgian Applications of Automatic Arc Welding.** P. de Marneffe. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 320-336.

Research on electrode coatings regarding protection of the arc against air, increase of penetration, and heavier metallic deposition. Diagrams, photographs. (K1)

520-K. (French.) **Drawing Up, Execution, and Inspection of Welded Structures.** H. Louis. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 336-356.

General study. Diagrams, photographs. (K general, S general)

521-K. (French.) **Reduction of Cost of Welded Construction.** F. Guyot. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 357-367.

Cost factors of construction made up principally for curved and flat sheets. Each class is analyzed with respect to operational methods, tools and difficulties inherent to the rough state of materials used. (K general)

522-K. (French.) **Metallurgical Aspects of Welding Problems.** Albert Portevin. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 375-383.

Special structure of the crater action of hydrogen, structural changes due to the welding thermal cycle, and problem of brittle fracture. (K9, Q26, ST)

523-K. (German.) **Present Status of Riveting in Light-Metal Structures.** E. W. Pleines. *Aluminium,* v. 29, no. 6, June 1953, p. 256-260.

Cold-hammered rivets, riveting compounds and techniques employed. British experience with large rivets in light metal structures. Tables, photographs, diagrams. 4 ref. (K13, Al)

524-K. (German.) **Welding and Cutting Technique.** K. Becker. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 590-592.

Modern equipment for welding and flame cutting. Photographs. 70 ref. (K general, G22)

525-K. (Hungarian.) **Present Problems of Improving Cast Iron.** Andras Pintér. *Ontöde,* v. 4, no. 4, Apr. 1953, p. 86-91.

Author's and Soviet experiences for repairing defective castings by various surface treatments, welding, and metal spraying. Diagrams, tables. (K general, L23, CI)

526-K. The Properties of the Inert-Gas Shields in Welding. J. G. Solomon. *Australasian Engineer,* May 7, 1953, p. 56-62.

Paper presented before Sydney Branch, Australasian Welding Institute, Sept. 1952. Properties of the shields produced by H, He and A. Photographs, diagrams. 20 ref. (K1)

527-K. Welded Light Alloy Yacht. *Engineer,* v. 196, July 31, 1953, p. 138-139.

Use of argon-arc process. Photographs. (K1, Al)

528-K. Modern Practice in the Welding of Pipes. Background and Present Trends. E. Fuchs and A. J. P. Tucker. *Institute of Welding, Transactions,* v. 16, June 1953, p. 63-73.

Shows that the adoption of correct technique and application of a sound testing procedure make possible the production of high-quality butt welds in mild steel pipes. Application of the argon-arc process to the welding of 18-8 and 3% Cr-Mo piping. Photographs, diagrams, tables. 9 ref. (K1, SS, AY, CN)

529-K. Resistance Welding and Its Use in Aircraft Construction. Thomas A. Dickinson. *Sheet Metal Industries,* v. 30, Aug. 1953, p. 661-664.

Photographs. (K3)

530-K. Brazing Tips for Flexible Hose. James R. Summer. *Steel,* v. 133, Aug. 10, 1953, p. 99-100.

Advantages and proper use of Ag brazing. Photographs. (K8, Ag)

531-K. What Goes Into a Welding Electrode? I. D. L. Mathias. *Welding Engineer,* v. 38, Aug. 1953, p. 27-30, 61-62.

Electrode design and formulation. Graphs, photographs. (To be continued.) (K1)

532-K. Sky Tower for Sky Harbor. T. B. Jefferson. *Welding Engineer,* v. 38, Aug. 1953, p. 36-37.

Control tower of welded steel construction. Shop fabrication and field erection. Photographs.
(K general, T26, ST)

533-K. Arc Length. Current. Voltage. I.-II. Bruce L. Baird. *Welding Engineer,* v. 38, July 1953, p. 38-41, 43; Aug. 1953, p. 39-41.

Part I: Fundamentals of relays, transformers, autotransformers, electric motors and generators. Part II: What to do about an unstable arc, automatic welding flux, drive-roll pressure, and problems encountered when automatic welding is done on cylindrical workpieces. Diagrams. (K1)

534-K. Vital Tools for Vital Maintenance Jobs. Walter E. Schaefer. *Welding Engineer,* v. 38, Aug. 1953, p. 42-45.

Abstract of paper given at the International Acetylene Assoc., Atlanta, Ga., Apr. 13-15, 1952. Emphasizes importance of the oxy-acetylene flame in steel mill maintenance. Photographs. (K2)

535-K. Farm Implements Tailored to Fit. Thomas A. Dickinson. *Welding Engineer,* v. 38, Aug. 1953, p. 46-47.

Use of welding techniques to alter or rebuild standardized farm implements to meet specialized needs. Oxy-acetylene cutting torches and arc welding equipment. Photographs. (K2, K1)

536-K. Specifications for Brazing Filler Metal. AWS-ASTM Specification B260-52T. *Welding Engineer,* v. 38, Aug. 1953, p. 51.

Tabulated information for Al-Si, Cu, Cu-Zn, Cu-P, Mg, Ag, and Cu-Au. (K8, S22, Al, Cu, Zn, Mg, Ag, Au)

537-K. Metal-Arc Welding of Thick Aluminium-5% Magnesium Plate. W. G. Hull, P. T. Houldcroft, and J. D. Chadwick. *Welding Research,* v. 7, June 1953, p. 59-64.

Causes of low weld strength. Tables, photographs. (K1, Al)

538-K. Gaseous Additions to the Argon Shield in Welding Aluminium. D. C. Moore. *Welding Research,* v. 7, June 1953, p. 68-74.

Experimental work and results. Photographs, diagram, table.
(K1, Al)

539-K. (French.) **Suggestions for a Classification of Welding Tests.** H. Granjon. *Revue de la Soudure (Brussels),* v. 9, no. 2, 1953, suppl. p. 1-13.

Diagrams, tables. 5 ref. (K9)

540-K. (French.) **Metallic Bridge Constructions With Special Consideration to Welding Techniques.** K. Lange. *Revue de la Soudure (Brussels),* v. 9, no. 2, 1953, p. 67-77.

German practice. Table, diagrams. (K general, T26, ST)

541-K. (French.) **Recommendations Worked Out by the No. 9 Commission (Weldability) of International Institute of Welding.** *Revue de la Soudure (Brussels),* v. 9, no. 2, 1953, p. 83-87.

Minimum requirements for C or low-Mn structural steels for arc welding. Tables. (K1, ST, AY)

542-K. (French.) **Spot Welding of Semi-Hard, Low-Alloy Steel. Suggestions Concerning a Definition of a Good Weld and Electronic Control of Welding Machines.** P. Joumat. *Soudure et Techniques Connexes,* v. 7, nos. 5-6, May-June 1953, p. 113-128; disc., p. 128-130.

Production and testing methods. Tables, photographs, diagrams.
(K3, AY)

543-K. (French.) **Welded Construction of Electric Locomotives.** P. Formaget. *Soudure et Techniques Connexes,* v. 7, nos. 5-6, May-June 1953, p. 131-141; disc., p. 141-144.

Lists 18 suggestions applicable to a particular case. Production details of two types of locomotive chassis in service. Diagrams, photographs. (K general, T23, ST)

544-K. (Book.) **Electric Arc and Oxy-Acetylene Welding. Ed. 4.** E. A. Atkins and A. G. Walker. 352 p. Sir Isaac Pitman & Sons, Ltd., Parker St., Kingsway, London, W.C.2, England. 30s.

Subjects covered include prepara-

tion of joints; metal cutting by electric arc and gas; effects of thermal expansion and contraction; weld defects and their detection; and welding of various metals and alloys. Information on the training of welders; regulations and specifications; and safety precautions to be observed. (K1, K2)

545-K. (Book.) **Welding Aluminum.** 186 p. Reynolds Metals Co., 2500 S. Third St., Louisville, Ky.

Comprehensive review of welding methods for Al and alloys. Illustrations, tables. (K general, Al)

546-K. (Book—German.) **(Welding Design.) Schweisstechnische Berechnungen** Ernst Klosse. 64 p. 1951. Springer-Verlag, Berlin, Germany.

Problems of electric and gas welding. Discusses strength of materials in an elementary way. (K1, K2)

547-K. (Book—Russian.) **(Information Material for Welders.) Spravochnye Materialy dlia Svarchchikov.** 1951. Mashgiz, Moscow, Russia.

The practical side of the book is reflected by studies drawn from factories, laboratories, institutes, etc., but, technically, it is obsolete. (K general)

L

Cleaning, Coating and Finishing

497-L. The Manufacture of Tinplate. E. A. Lancaster. *Canadian Metals,* July 1953, p. 16, 18.

Hot dip and electrolytic methods. (L16, L17, Sn, CN)

498-L. Chromium Plating for .50-In. Gun Barrels. *Canadian Metals,* v. 16, July 1953, p. 38-39.

Plating procedure, bath installation and lead electrodes. Photograph. (L17, Cr)

499-L. Present Trends in Automobile Finishing. Sophur Bolme. *Chemistry in Canada,* v. 5, July 1953, p. 34-35.

Excerpts from paper presented at the 36th Annual Conference, The Chemical Institute of Canada, Windsor, June 4-6, 1953. Trends in metal preparation, undercoats, colors and lacquers. (L26)

500-L. Abrasive Liquid Polishing of Hollow Cylinders. E. A. Satel. *Engineers' Digest,* v. 14, July 1953, p. 250. (Translated and condensed from *Stanki i Instrument,* no. 9, 1953, p. 26-27.)

Equipment. Diagrams. (L10, AY)

501-L. Producing Pressed Steel Bathtubs and Sinks at Norris-Thermador. Gilbert C. Close. *Finish,* v. 10, Aug. 1953, p. 23-26, ST20-ST21.

Finishing processes. Photographs. (L general, CN)

502-L. New Facilities Speed Production of the Lovell Drying System. Walter Rudolph. *Finish,* v. 10, Aug. 1953, p. 35-37, ST11.

Fabrication, finishing, assembly, handling and packaging of clothes dryers. (L general)

503-L. Cleaning Cast Steel Armor. Erle F. Ross. *Foundry,* v. 81, Aug. 1953, p. 178, 180-181.

Blasting large armor parts. Photographs. (L10, CI)

504-L. Vacuum Metallizing of Plastics. J. Gordon Seiter. *India Rubber World,* v 128, July 1953, p. 493-496.

Equipment, process and applications. Uses Al as an example. Photographs. (L25, Al)

505-L. Aluminum Bronze Overlay Lengthens Life of Steel Processing Equipment. W. F. Stewart. *Industry & Welding,* v. 26, Aug. 1953, p. 76, 78.

Photographs. (L24, Al, SS, AY, CN)

506-L. Attenuation and Surface Roughness of Electroplated Waveguides. F. A. Benson. *Institution of Electrical Engineers, Proceedings,* v. 100, pt. 3, July 1953, p. 213-216.

Study made of surface roughness of various sizes of waveguide tubing when electroplated internally. Merits of different types of electroplate and effects of variations in plating thickness and current density. Micrographs. 11 ref. (L17, S15)

507-L. Finishing Flat Surfaces on Small Quantity-Produced Components. *Machinery (London),* v. 83, July 17, 1953, p. 115-116.

Apparatus for finishing process. (L general)

508-L. Some Typical Applications of the Fescol Electro-Deposition Process. *Machinery (London),* v. 83, July 24, 1953, p. 161-167.

Reclaiming worn components and Cr deposition on broaches and Al. Photographs. (L17, Al, Cr, TS)

509-L. The Effect of Chromium Plating of Steel on the Fatigue Limit. I-II. George M. Cabble, Jr. *Metal Finishing,* v. 51, June 1953, p. 106-108; July 1953, p. 60-63.

Fatigue limit of AISI 4340 steel with different thicknesses of plating. Graphs. 12 ref. (L17, Q7, Cr, ST)

510-L. Experimental Plating of Internal Engine Parts. George W. Grupp. *Metal Finishing,* v. 51, July 1953, p. 53-55.

Development of a single metal protective coating for steel parts. (L17, Cd, Sn, Pb, Cr)

511-L. How to Combat Pipe-Line Corrosion. *Oil and Gas Journal,* v. 52, July 27, 1953, p. 363.

Use of coatings to prevent corrosion. (L general, R10)

512-L. Metal Cleaning Equipment and Methods. III. John E. Hyler. *Organic Finishing,* v. 14, July 1953, p. 14-18.

Equipment and techniques for combined cleaning operations utilizing automatic transfer, cycle washers, drum washers, and specialized systems. Types of agitation and other cleaning methods. Photographs. (L10, L12)

513-L. Metal Coating for Plastics. *Plastics,* v. 18, July 1953, p. 248-250.

Importance of correct selection and methods of applying lacquers to the moldings before coating and to the finished metallized article. Relative merits of various metal coating techniques. Photographs. (L23)

514-L. How to Use Steel Balls and Shapes for Barrel Finishing. R. M. Terry. *Precision Metal Molding,* v. 11, Aug. 1953, p. 46-52.

Barrel finishing with steel balls and special shapes. Methods, materials and process details. Photographs. (L10, ST)

515-L. Tin-Nickel Alloy Plating Current Progress. *Tin and Its Uses,* June 1953, p. 10-11.

General modifications in technique. (L17, Sn, Ni)

516-L. Ultrasonics for Metal Cleaning. *Western Machinery and Steel World,* v. 44, July 1953, p. 98.

Description. Photographs. (L10)

517-L. (French.) **Comparison of Results Obtained by Chemical and Anodic Polishing of Aluminum Surfaces.** A. Fischer and L. Koch. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 131-135.

Studies were made under the electron microscope to compare E. W. chemical brightening process with V.A.W. anodic process. Tables, photographs. 7 ref. (L14, L19, Al)

518-L. (German.) **"Sanding" on the Surface of Hot-Galvanized Sheet Metal.** Hans-Joachim Wiester and Dietrich Horstmann. *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 902-906.

"Sandy" roughness on Zn-plated sheet metal caused by undissolved hard Zn deposits and defective sheet metal surfaces. Photographs. (L16, Zn, CN)

519-L. (German.) **"Tear" Formation on Zinc-Plated Sheet Metals.** Hans-Joachim Wiester and Dietrich Horstmann. *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 906-908.

Studies made to determine the cause of tear-drop shaped agglomerations of Zn on the surface. Photographs. 3 ref. (L16, Zn, CN)

520-L. (German.) **High-Temperature Resistant Materials Obtained by Sillconizing Tungsten and Molybdenum.** E. Fitzer. Paper from "Plansee Proceedings 1952", Metallwerk Plansee G.m.b.H., p. 244-253; disc., 253-258.

Advantages of the process which protects metals against oxidation. Micrographs, graphs. (L15, W, Mo)

521-L. (Russian.) **Use of Direct Current in Electrometallizer EM-3.** A. M. Edel'son. *Avtogennoe Delo,* v. 23, no. 6, June 1952, p. 23.

Use of d.c. instead of a.c. increased production 2.5 times and improved the quality of coating. (L17)

522-L. (Russian.) **Determination of the Coefficients of Cathodic Sputtering of Metals by Ions of the Same Metals.** L. N. Dobretsov and N. M. Karnauchova. *Doklady Akademii Nauk SSSR,* v. 85, new ser. no. 4, Aug. 1, 1952, 745-748.

Dependence of cathode sputtering of Cu, Mn, Fe and Pb on the ion energy. Tables, graphs. Ref. (L25, Cu, Mn, Fe, Pb, Sn)

523-L. (Russian.) **Automatic Device APT-2 for the Control of Current Density and Time of Electroplating Processes.** V. L. Gembol. *Promyshlennaia Energetika,* v. 9, no. 9, Sept. 1952, p. 11-14.

Circuit drawings. (L17)

524-L. Anodic Formation of Coatings on Magnesium, Zinc, and Cadmium. Kurt Huber. *Electrochemical Society, Journal,* v. 100, Aug. 1953, p. 376-382.

Paper given at the Philadelphia Meeting of the Electrochemical Society, May 4-8, 1952. Report of investigations of anodically formed coatings on Mg, Zn and Cd in NaOH and Na_2CO_3 solutions. Growth of the coatings was studied by X-ray and electron diffraction and electron microscopy. Micrographs, graphs. (L19, Mg, Zn, Cd)

525-L. The Mechanism of Electropolishing of Copper in Phosphoric Acid Solutions. II. The Mechanism of Smoothing. J. Edwards. *Electrochemical Society, Journal,* v. 100, Aug. 1953, p. 223C-230C.

Qualitative and quantitative study of smoothing action. Diagrams, graphs. (L13, Cu)

526-L. Coated Steels Can Cut Breakage on Drawn Parts. N. E. Hays. *Iron Age,* v. 172, Aug. 13, 1953, p. 135-137.

Advantages offered by Zn and phosphate-coated steels. Photographs, micrographs. (L14, L16, G21, Zn, ST)

527-L. Selecting Protective Coatings for Metals. John B. Campbell. *Materials & Methods,* v. 38, Aug. 1953, p. 109-124.

Corrosive environment, mechanical durability, appearance and cost. Conversion, organic, metallic and vitreous coatings. Photographs. (L general, R10)

528-L. (French.) **Cast Iron. Contribution to the Study of Diffusion Coat-**

The PROTECTION of ALUMINUM

Drawing courtesy of Piasecki Helicopter Corporation, Morton, Pennsylvania

THE H-21 Piasecki Tandem Helicopter—the "Work Horse"—is ideally suited for rescue work in areas inaccessible by other means, and in all kinds of rough weather.

For durable paint adhesion and high corrosion-resistance aluminum parts of the "Work Horse" are Alodized. The "Alodine" protective coating chemical bonds paint, extends paint life, and protects unpainted aluminum.

Because of its economy, effectiveness, and ease of application, the Alodizing process is finding wide-spread use in the aircraft field and in other industries fabricating products of aluminum.

Alodized aluminum meets the requirements of Military Specification MIL-C-5541. Write or call for coating and process data on "Alodine".

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"Alodine" forms an amorphous non-metallic surface on aluminum which is thin, tough, durable, continuous with and a part of the basis metal. The "Alodine" film (or skin) anchors paint, prolongs paint life, and protects aluminum exposed unpainted to the atmosphere.

ALODIZING IS EASY AND EFFECTIVE

The Alodizing process is a chemical one and does not require electrolytic techniques or equipment. Alodizing is simple, fool-proof, low in cost, and requires a minimum of equipment. Essentially, the process consists of the following easily controlled operations or steps:

1. Cleaning the work.
2. Rinsing the cleaned aluminum surfaces.
3. Coating with "Alodine."
4. Rinsing with clean water.
5. Rinsing with warm "Deoxylyte" (acidulated rinse).
6. Drying.

AFTER TREATMENTS: Alodized aluminum provides an ideal bonding surface for paint, wax, adhesive, or other organic finishes. These should be applied in accordance with the manufacturer's directions. Unpainted or exposed areas will be protected by the tough, durable "Alodine" skin.

"ALODINE" MEETS SERVICE SPECIFICATIONS

"Alodine" applied by immersion or spray complies with the rigid performance requirements of both industrial and Government specifications. The following is a list of Service Specifications which "Alodine" meets.

MIL-C-5541	U.S. Navord O.S. 675
MIL-S-5002	16E4 (SHIPS)
AN-E-19	AN-C-170 (See MIL-C-5541)
AN-F-20	U.S.A. 72-53 (See AN-F-20)

ing. Andre Guédras. *Métallurgie et la Construction Mécanique*, v. 84, no. 12, Dec. 1952, p. 929, 931, 933-934, 937, 939; v. 85, no. 1, Jan. 1953, p. 27, 29-31, 33; no. 2, Feb. 1953, p. 105, 107, 109-110; no. 3, Mar. 1953, p. 181, 183, 185-186, 189; no. 4, Apr. 1953, p. 269-270, 273.

Part I: Surface treatments for solid-liquid cast iron. Part II: Theory of cementation and cementation by substances other than C. Part III: practical industrial applications. Part IV: Composition and properties of metals. Diagrams, photographs. 10 ref. (L15, J28, CI)

529-L. (French.) Electrolytic Zinc Plating. J. Liger. *Métallurgie et la Construction Mécanique*, v. 85, no. 4, Apr. 1953, p. 301, 303, 305.

Problems associated with bright, alkaline and acid baths. (L17, Zn)

530-L. (French.) A Great Achievement in the Struggle Against Corrosion. Lead Cyanamide. Roger Delmas. *Métallurgie et la Construction Mécanique*, v. 85, no. 6, June 1953, p. 497, 499, 501.

Progress and efficacy of $PbCn_2$ coatings. Tables. 14 ref. (L14, Pb, CN)

531-L. (French.) Hot Tinning. G. Haas and A. Gordet. *Métallurgie et la Construction Mécanique*, v. 85, no. 5, May 1953, p. 401, 403; no. 6, June 1953, p. 501, 503, 505.

Part II: Preparation of metal surfaces with hydrofluoric acid, and method of protecting the walls of vessels with vinyl polychloride. Part III: Importance and composition of good fluxes in the tinning of metals. (L16)

532-L. (German.) Anodized Patterns on Aluminum. E. Herrmann. *Aluminium*, v. 29, no. 5, May 1953, p. 194-197.

Application of special surface effects on the preservation coatings on Al. 28 ref. (L19, Al)

533-L. (German.) Vitreous Enamels on Aluminum. *Aluminium*, v. 29, no. 5, May 1953, p. 200-202.

Composition and fabrication of fritted enamels, applicability, materials, pretreatment, enameling process, characteristics and applications. Photographs, graphs. 5 ref. (L27, Al)

534-L. (German.) Liquid Noble-Metal Preparations for Metallizing of Ceramic Materials and Plastics. M. Kollmar. *Metall*, v. 7, nos. 11/12, June 1953, p. 427-429.

Composition, preparation and application of noble metal coatings for condensers, spools and resistances. Soft solder compounds and bases for electroplating. (L23, EG-c)

535-L. (German.) Remarks on Chemically Reactive Primers and Rust-Protecting Agents. Von Bernhard and F. H. Scheifele. *Werkstoffe und Korrosion*, v. 4, no. 6, June 1953, p. 208-209.

Modern primers that contain an acid which reacts with the metal to form a corrosion resistant dense coat and a highly adhesive surface for the top coat of paint. (L26)

536-L. (Russian.) Reduction of Rust by Currents of Constant Density. A. S. Afanas'ev. *Zhurnal Prikladnoi Khimii*, v. 26, no. 2, Feb. 1953, p. 170-177.

Removal of rust without loss of metal in alkaline solutions. Graphs. 13 ref. (L12, CN)

537-L. Investigation of Gases Evolved During Firing of Porcelain Enamels. Dwight G. Moore and Mary A. Mason. *American Ceramic Society, Journal*, v. 36, Aug. 1953, p. 241-249.

Examination of gas evolution, fired specimens for changes in bubble structure, changes in normal gas evolution when water-free enamels are used, trapped gases, sources of carbon gases and effect of pretreatments of the clay. Tables. (L27)

538-L. Galvanizing of Small Metal Parts. G. Steiner. *Brown Boveri Review*, v. 39, Nov./Dec. 1952, p. 452-454.

Installation with which it is possible to centrifuge galvanized parts immediately after removing them from the Zn bath. Diagram, photograph. (L16, Zn, CN)

539-L. More Uniform Surfaces Produced With Alumina Spray. *Chemical and Engineering News*, v. 31, Aug. 10, 1953, p. 3284.

Waterblast process for bearing surfaces and coating preparation. (L23)

540-L. Paint Coating Thickness Meters. R. Quarendon. *Engineer*, v. 196, July 31, 1953, p. 130-133.

Design, use and limitations of meters. Photographs. (L26, S14)

541-L. The Fight Against Corrosion. *Material Flow*, v. 8, Aug. 1953, p. 112, 114-115, 126, 128.

Water, moisture vapor, and greaseproof flexible barriers. Photographs. (L26)

542-L. Electrodeposition of Tin-Nickel Alloys. *Metal Finishing*, v. 51, July 1953, p. 64-69.

Previously abstracted from *Electrochemical Society, Journal*. See item 168-L, 1953. (L17, Sn, Ni)

543-L. Stripping Phosphate Coatings. Radiometric Evaluation of a New Stripping Solution. Stanley L. Eisler and Jodie Doss. *Metal Finishing*, v. 51, Aug. 1953, p. 58-63.

Testing method. (L14, S19)

544-L. Anodes for Electroplating. A. C. West. *Metal Finishing*, v. 51, Aug. 1953, p. 66-70, 74.

Common forms of anodes used in Cu, Cd, Zn and Ni plating. Selection of anode length and problem of insoluble anode surface. Tables. (L17, Cu, Cd, Zn, Ni)

545-L. Porcelain Enamel. Orphan of the Metal Finishing Industry. Eugene M. Smith. *Metal Finishing*, v. 51, Aug. 1953, p. 71-74.

Characteristics and uses. Photographs, table. (L27, CN)

546-L. Electrodeposition of Uranium Oxide on Aluminum. Carl R. Wilson and A. Langer. *Nucleonics*, v. 11, Aug. 1953, p. 48.

(L17, Al)

547-L. Bright Gold Plating. Edwin C. Rinker. *Plating*, v. 40, Aug. 1953, p. 861-866; disc., p. 866-867.

New process which eliminates buffing and has greater uniformity of deposit distribution. Tables, micrographs. (L17, Au)

548-L. Statistical Quality Control. A New Tool for the Electroplater. Ezra A. Blount. *Plating*, v. 40, Aug. 1953, p. 868-872; disc., p. 872-873.

Control of solution composition and pH. Recording and control of rejected parts. Examples in two plating installations. Graphs, photographs. 10 ref. (L17, S12)

549-L. Iron Plating From an Alkaline Bath. Edward F. Foley, Jr., Henry B. Linford, and Walter R. Meyer. *Plating*, v. 40, Aug. 1953, p. 887-892; disc., p. 892-893.

Data on effects of both components on cathode efficiency and operating characteristics. Tables, graphs. 5 ref. (L17, Fe)

550-L. Current and Metal Distribution in Electrodeposition. III. Experimental Determination of Metal Distribution. John Kronsbein. *Plating*, v. 40, Aug. 1953, p. 898-901.

Effects of fillet radius and shank length in plating on recessed surfaces. Graphs, photograph. (L17)

551-L. More on Metal Coatings. L. G. Jones. *Power Engineering*, v. 57, Aug. 1953, p. 74-75.

Corrosion effects and galvanizing versus Cd-plating. Tables, photograph.

(L16, L17, Cn, Ni, Cu, Al, Sn, Pb, AY)

552-L. Finishes for Soft Soldering. Fused and Flowed Coatings of Electrotin. E. E. Halls. *Product Finishing*, v. 6, July 1953, p. 52-58, 120.

Methods of treating electrotinned products to have same desirable qualities as hot-dipped articles. (L16, Sn)

553-L. Problems of Paint Adhesion. E. Johnson. *Product Finishing*, v. 6, July 1953, p. 61-64, 120.

Causes and cures for poor paint adhesion on Zn, Fe, Pb, Al and Mg. (L26, Zn, Fe, Pb, Al, Mg)

554-L. Statistical Quality Control Improves Efficiency of Chromium Plating Operation. Frank L. Bonem. *Products Finishing*, v. 17, Aug. 1953, p. 24-28, 30, 32, 34, 36.

Use in production of International Harvester cotton-picker spindles. System is applied to three automatic plating baths. (L17, S12, Cr)

555-L. How to Protect Magnesium Against Wear. *SAE Journal*, v. 61, Aug. 1953, p. 37-39.

Based on paper "Wear Characteristics of Mg" by E. L. Schaper, presented at SAE Annual Meeting, Detroit, Jan. 13, 1953. Electroplating with Cr or Cu, anodic treatment and spray coatings. Tables, photographs. (L17, L19, L23, Cr, Cu, Mg)

556-L. The Distribution of Aluminium in Industrial Galvanizing Baths. N. B. Rutherford. *Sheet Metal Industries*, v. 30, Aug. 1953, p. 657-660, 680.

Determines that vertical segregation may occur. Diagrams, tables. 18 ref. (L16, Zn, Al)

557-L. Modern Industrial Finishes for Sheet-Metal Products. H. J. Testro. *Sheet Metal Industries*, v. 30, Aug. 1953, p. 665-668, 680.

Main types of organic coating materials for industrial sheet-metal and allied products. (L26)

558-L. Spotlighting Finishing Progress. Seymour Senderoff. *Products Finishing*, v. 17, Aug. 1953, p. 54-56, 58, 62, 64, 66, 68, 70, 74, 76, 78, 80, 82, 86, 88, 90, 92, 94.

Four recent papers are discussed: "Electrodeposition of Alloys", by E. Raub; "Tin-Nickel Alloy Plates", by N. Parkinson and H. P. Rooksby; "A High-Conductivity Glass-To-Metal Seal", by J. C. Turnbull; and "Aluminum Plating", by W. Menzel. The first and last articles are translations from German and the article by E. Raub was previously abstracted from *Metalloberfläche*, (item 450-L, 1953.)

(L general, Cu, Au, Mo, W, Ni, Ag, Pb, Zn, Bi, Sb, Cd, Sn, Cr, Rh, Al)

559-L. Stainless Strip Descaled and Brightened Continuously. Lorenz H. Wilson. *Steel*, v. 133, Aug. 10, 1953, p. 96-98.

Equipment and method to anneal, descale, and electropickle the strip. Diagrams, photographs. (L12, J23, SS)

560-L. Coating Steel With Aluminum. I. and II. *Steel*, v. 133, Aug. 3, 1953, p. 98-101, 128; Aug. 10, 1953, p. 138-140, 142.

Adapted from "Aluminum in Iron and Steel" by Samuel L. Case and Kent R. Van Horn, (item 152-B, 1953). Several techniques. Choice depends on purpose of coating and type of part. Details of hot dipping. (L17, Al, C)

561-L. Vacuum Process Brightens Plating Picture. George A. Goetz. *Steel*, v. 133, Aug. 17, 1953, p. 166-167.

Vacuum coating, advantages and uses. (L25)

562-L. Get the Most From Your Wire Enameling Dies. Richard Bliss. *Wire and Wire Products*, v. 28, Aug. 1953, p. 784-787, 812, 813, 815, 817.

Proper use of dies to obtain desired thickness of film on wire. Photographs, diagram. (L27)

563-L. (German.) **Improvement of Plastics. Plastics are Metallized.** L. Hiesinger. *Umschau in Wissenschaft und Technik*, v. 53, no. 13, July 1, 1953, p. 403-405.

Coating of palstic materials and textiles with metal by the vapor deposition process. Photographs, tables, diagrams. (L25, Al, Au, Zn)

M

Metallography, Constitution and Primary Structures

279-M. The Electron Microscope in Metallurgical Research. R. D. Stacey. *Birmingham Metallurgical Society, Journal*, v. 33, June 1953, p. 53-62.

Various types of electron microscopes, together with the limitations imposed by replica techniques. Some applications in metallurgical research. 10 ref. (M21)

280-M. Recent Developments in Metallurgical Microscopy. B. Arnold. *Birmingham Metallurgical Society, Journal*, v. 33, June 1953, p. 63-78.

Development of ultraviolet light microscope, polarized light microscope, phase-contrast microscopy, opaque-stop microscope, high-temperature microscopy, and electron microscope. Diagrams. 6 ref. (M21)

281-M. The Crystal Structure of $ThSe_2$ and Th_7Se_{12}. R. W. M. D'Eye. *Chemical Society, Journal*, June 1953, p. 1670-1672.

Determined by the X-ray powder technique with Guinier-type cameras. $ThSe_2$ is orthorhombic and Th_7Se_{12} is hexagonal. Crystal data. (M26, Th, Se)

282-M. The Liquidus⇌Solidus Relations in the System Iron-Cobalt in the Range 0-30 Atomic % Cobalt. G. B. Harris and W. Hume-Rothery. *Iron and Steel Institute, Journal*, v. 174, July 1953, p. 212-217; disc., p. 217-218.

Apparatus for accurate determination of liquidus and solidus points of Fe alloys by thermal analysis, and details of experimental technique. Diagram, graphs, tables. 13 ref. (M23, M24, Fe, Co)

283-M. Examination of a High Sulphur Free-Machining Ingot, Bloom and Billet Sections. D. J. Carney and E. C. Rudolphy. *Journal of Metals*, v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 999-1008.

Ingot solidification, size, shape, distribution and composition of inclusions from the ingot to the billet in a high-sulphur, free-machining steel. Diagrams, tables, micrographs, graphs. 14 ref. (M28, CN)

284-M. Modifications of the Schulz Technique for the X-Ray Determination of Preferred Orientation in Rolled Metal. M. L. Fuller and George Vaux. *Journal of Metals*, v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1038.

Apparatus and operation. Photograph. (M22, N5)

285-M. An X-Ray Camera for Measuring Preferred Orientation in Wires. A. L. Mackay. *Journal of Scientific Instruments*, v. 30, July 1953, p. 244-245.

A camera combining the advantages, for orientation determination, of flat plate and normal powder cameras. Diagram, graph. 4 ref. (M22, N5, Cu)

286-M. Electron Microscope Photographs of Polished Mineral Surfaces. J. Kenyon. *Nature*, v. 172, July 18, 1953, p. 114-115.

Preparation of thin-film replicas of polished surfaces. Photographs. (M21)

287-M. *p-n* Junction Revealed by Electrolytic Etching. E. Billig and J. J. Dowd. *Nature*, v. 172, July 18, 1953, p. 115.

Method based on rectifying behavior of the junction. Table, photograph. (M21, P15, Ge)

288-M. The Study of Crystal Growth With the Electron Microscope. III. Growth-Step Patterns and the Relationship of Growth-Step Height to Molecular Structure in *n*-Nonatriacontane and in Stearic Acid. N. G. Anderson and I. M. Dawson. *Royal Society, Proceedings*, v. 218, ser. A, June 1953, p. 255-268.

Procedure and results. Diagrams, micrographs. 25 ref. (M21, N12)

289-M. (English.) **Stacking Faults in γ-Alumina.** J. M. Cowley. *Acta Crystallographica*, v. 6, pt. 1, Jan. 1953, p. 53-54.

Electron-diffraction patterns of gamma-alumina show extra spots. These are described as faults in the cubic stacking of O atoms. Some Al atom sites are "unfavorably" near normal Al atoms. Suggests that vacant Al sites, occur preferentially in γ-alumina. (M25, Al)

290-M. (English.) **Two Unconventional Uses of a Weissenberg Goniometer.** E. J. W. Whittaker. *Acta Crystallographica*, v. 6, pt. 1, Jan. 1953, p. 93.

For equi-inclination rotation photography and for semi-integrating rotation photography. (M23)

291-M. (English.) **The Crystal Structure of the Intermetallic Compound $Mg_6Si_7Cu_{16}$.** Gunnar Bergman and John L. T. Waugh. *Acta Crystallographica*, v. 6, pt. 1, Jan. 1953, p. 93-94.

Determined by stochastic method. Findings agree with those of Witte who used the X-ray method. (M26, Mg, Si, Cu)

292-M. (English.) **The External Shape of Antimony Oxide (Sb_2O_3) Formed on the Cleavage Surface of Stibnite.** Masaru Watanabe and Ryuzo Ueda. *Acta Crystallographica*, v. 6, pt. 1, Jan. 1953, p. 95.

Direct observation of Sb_2O_3 by electron micrography does not agree perfectly with the results from electron diffraction studies. (M26, M21, M22, Sb)

293-M. (English.) **The Crystal Chemistry of the Laves Phase.** R. L. Berry and G. V. Raynor. *Acta Crystallographica*, v. 6, pt. 2, Feb. 1953, p. 178-186.

Interatomic distances were examined in $C_{14}(MgZn_2)$, $C_{15}(MgCu_2)$ and $C_{36}(MgNi_2)$ crystals. Considerations can be used in the prediction of Laves phases in new alloy systems. (M26, Mg, Zn, Cu, Ni)

294-M. (English.) **The Crystal Structure of NaPb.** Richard E. Marsh and David P. Shoemaker. *Acta Crystallographica*, v. 6, pt. 2, Feb. 1953, p. 197-205.

Determined by crystal and powder X-ray diffraction. Data are presented. (M26, Na, Pb)

295-M. (English.) **The Crystal Structure of $BaCd_{11}$.** M. J. Sanderson and N. C. Baenziger. *Acta Crystallographica*, v. 6, July 10, 1953, p. 627-631.

Experimental procedures, X-ray data and structure determination. Tables, digarams. (M26, Cd, Ba)

296-M. (English.) **The Polarization Factor for Inclined-Beam Photographs Using Crystal-Reflected Radiation.** E. J. W. Whittaker. *Acta Crystallographica*, v. 6, pt. 2, Feb. 1953, p. 222-223.

Describes above when polarization is increased by crystal reflection. (M23)

297-M. (English.) **X-Ray Scattering by Aggregates of Bonded Atoms. III. The Bond Scattering Factor. Simple Methods of Approximation in the General Case.** R. McWeeny. *Acta Crystallographica*, v. 6, July 10, 1953, p. 631-637.

General approximate methods of calculating the bond scattering factor formulas covering all cases arising from bonds involving (1s), (2s) and (2p) electrons. Includes graphs. 11 ref. (M25)

298-M. (English.) **The Location of Oxygen Atoms in Vanadium-Oxygen Alloys by Means of Neutron Diffraction.** C. W. Tucker, Jr., A. U. Seybolt, and H. T. Sumison. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 390-393.

Compares X-ray and neutron diffraction methods for locating oxygen atoms in alloys. (M22, V)

299-M. (English.) **The Surface Structures of Deformed Aluminium, Copper, Silver, and Alpha Brass, and Their Theoretical Interpretation.** Doris Kuhlmann-Wilsdorf and Heinz Wilsdorf. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 394-413.

An electron microscope examination. Micrographs. 46 ref. (M26, M21, Al, Cu, Ag)

300-M. (English.) **High-Temperature Hexagonal Phase of Cobalt.** J. B. Newkirk and A. H. Geisler. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 456-457.

Results of experiments. (M26, Co)

301-M. (French.) **A New Phase in Aluminum-Copper Alloys.** Jean Jacques Trillat and Noboru Takahashi. *Comptes Rendus hebdomadaires des Seances de l'Academie des Sciences*, v. 236, no. 23, June 8, 1953, p. 2245-2247.

After aging a thin film of Al-Cu alloy (40% Al) at room temperature a new phase (type CsCl) was detected. (M26, Cu, Al)

302-M. (French.) **The Electron Microscope Gives Evidence of a Fine Substructure in Crystals of Aluminum and Its Alloys.** Pierre Bussy and Georges Chaudron. *Comptes Rendus hebdomaidaires des Seances de l'Academie des Sciences*, v. 236, no. 24, June 15, 1953, p. 2323-2325.

Studies were made with Al-Cu alloys containing 0.5 to 4.0% Cu. (M26, M21, Al, Cu)

303-M. (French.) **Researches on the Crystallization of Cast Irons Containing Spheroidal Graphite.** A. Wittmoser. *Revue de Métallurgie*, v. 50, no. 6, June 1953, p. 413-423.

Thermal analysis and microexamination of cast iron containing 1.5-4% C and 0.6-3% Si with and without heat treatment. Photographs, graphs. 27 ref. (M27, M23, CI)

304-M. (German.) **Increase in Lattice Spacing of Crystals by Additions.** J. Teltow. *Annalen der Physik*, v. 12, nos. 1-3, Apr. 1953, p. 111-120.

Corresponding data from macroscopic and radiographic investigations. 8 ref. (M26)

305-M. (German.) **Precision Investigations on the Zinc Lattice. Precision Measurements of the Lattice Constant and Investigation on Lattice Distortions.** Betsy Ancker. *Annaler der Physik*, v. 12, nos. 1-3, Apr. 1953, p. 121-144.

Comparison with other methods and a way to obtain a distortion-free lattice. Tables. 34 ref. (M26, Zn)

306-M. (German.) **Precision Investigation on Zinc Lattice. II. Twin Formation.** Betsy Ancker. *Annalen der*

Physik, v. 12, nos. 1-3, Apr. 1953, p. 145-154.

Manner of growth of twin lamellas and development of the mosaic structure. Photographs, graphs. 15 ref. (M26, Zn)

307-M. (German.) **Conversions of Iron Phosphides With Liquid Zinc.** Rudolf Vogel and Dietrich Horstmann. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, May-June 1953, p. 247-249.

Established equilibrium lines of the Fe-P-Zn group. Fe has greater affinity for P. Photographs. 4 ref. (M24, Fe, P, Zn)

308-M. (German.) **Hard-Metal Alloys of Higher Corrosion and Oxidation Resistance.** Josef Hinnüber and Otto Rüdiger. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, May-June 1953, p. 267-274.

Metallographic and X-ray studies on chromium carbide-Ni and chromium carbide-Co systems. Relation of phase structure and properties. 21 ref. (M24, Cr, Ni, Co)

309-M. (German.) **The Structure of Several Silicide Systems of Transition Metals.** H. Nowotny, H. Schroth, R. Kieffer, and F. Benesovsky. *Monatshefte für Chemie*, v. 84, no. 3, June 1953, p. 579-584.

Results of X-ray studies of the pseudo-binary systems $TiSi_2$—$CrSi_2$, $CrSi_2$—$TaSi_2$, and Cr_3Si—Mo_3Si. Tables, graphs. 6 ref. (M26, M24, Ti, Cr, Mo, Si)

310-M. (German.) **The Tantalum-Silicon System.** Richard Kieffer, Friedrich Benesovsky, Hans Nowotny, and Herbert Schachner. *Zeitschrift für Metallkunde*, v. 44, no. 6, June 1953, p. 242-246.

Melting-point and structure tests, results of which agree with those of X-ray tests made earlier. A temporary phase diagram was set up. Photographs, graphs, tables. 8 ref. (M24, Ta, Si)

311-M. (German.) **Fixed Correlation of Outer Electrons in Crystal Chemistry.** Konrad Schubert. *Zeitschrift für Metallkunde*, v. 44, no. 6, June 1953, p. 254-259.

Assumptions relative to bonding mechanism and the multiple-electron problem as applied to fixed correlations. Experiments showed the outer electrons are also involved in phases of such correlations. Diagrams. 25 ref. (M25)

312-M. (German.) **The Manganese-Indium System.** Siegfried Valentiner. *Zeitschrift für Metallkunde*, v. 44, no. 6, June 1953, p. 259-260.

At 80 atom. % Mn, a maximal magnetic saturation intensity of 12 gauss occurs at room temperature. Curie temperature lies near 300°. These results make probable the existence of Mn_4In. Graphs. 8 ref. (M24, Mn, In)

313-M. (German.) **Micro-Thermo-Analysis, Melting, and Crystallization of Solid Solutions.** A. Kofler. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 21-26.

Behavior of binary system upon formation of a simple eutectic; one or more molecular compounds; miscibility gaps of liquid phases; and solid solutions. Shows homogenization of solid solutions upon heating and cooling within the range between solidus and liquidus. Micrographs. 17 ref. (M24, N12)

314-M. (German.) **Ideal Crystals and Real Crystals.** A. Smekal. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 89-99; disc. p. 99.

Compares both types. Micrographs. (M26)

315-M. (Russian.) **New Method of Making Replicas for Electron Microscopic Examination of the Surface Structure of Metals.** I. Shugar. *Acta Technica Academiae Scientiarum Hungaricae*, v. 5, no. 1, 1952, p. 57-68.

Au and Al were used to prepare replicas of cast iron structures. Method described. (M21, Au, Al, CI)

316-M. (Russian.) **Grain Structure of Metals at High Temperature.** I. A. Oding and M. G. Lozenskii. *Doklady Akademii Nauk SSSR*, v. 86, new ser., no. 4, Oct. 1, 1952, p. 707-709.

Experimental data on high-temperature metallography. C steel and pure W and Mo were investigated. Micrographs. 5 ref. (M27, Mo, W, CN)

317-M. (Russian.) **Crystallization of Binary Alloys of the Eutectic Type.** Ia. V. Grechnyi. *Doklady Akademii Nauk SSSR*, v. 86, new ser. no. 5, Oct. 11, 1952, p. 977-980.

Metastable equilibrium and shapes of the solidus curves. Graphs, tables. 4 ref. (M24, N12)

318-M. (Russian.) **Phase Transition When the Thickness of Thin Metallic Films Is Changed.** A. I. Bublik and B. Ia. Pines. *Doklady Akademii Nauk, SSSR*, v. 87, new ser. no. 2, Nov. 11, 1952, p. 215-218.

Electron diffraction patterns for the structure of thin films of Be, V, Cr, Ni and Co. Stabilities of various phases. Photographs, 8 ref. (M27, N6, Be, V, Cr, Ni, Co)

319-M. Determination of the Orientation of Single Crystals of Titanium. A. T. Churchman. *Metallurgia*, v. 48, no. 285, July 1953, p. 50-51.

Method which uses the back reflection Laue technique. Tables. 7 ref. (M26, M22, Ti)

320-M. Constitution Diagram of the Copper-Zirconium Alloy System. Richard Norman Augustson. *U. S. Atomic Energy Commission*, AECD 3456, Dec. 20, 1950, 46 p. Available from OTS, Dept. of Commerce, Washington, D. C.

Constitution diagram of the Cu-Zr alloy system in the Zr-rich region and hardness properties of the alloys prepared. Photographs, tables, diagram, graph. 19 ref. (M24, Q29, Zr, Cu)

321-M. (English.) **The Probability Distribution of the Magnitude of a Structure Factor. I. The Centrosymmetric Crystal. II. The Non-Centrosymmetric Crystal.** J. Karle and H. Hauptman. *Acta Crystallographica*, v. 6, pt. 2, Feb. 1953, p. 131-141.

General formula derived as a function of the indices h, k and l. Distributions and averages for any power (F) may be obtained by routine mathematics. Examples are given. (M26)

322-M. (French.) **Formation of Alloys of the Al-Cu System by Evaporation of Pure Constituents in a Vacuum.** Pierre Michel. *Comptes rendus*, v. 236, no. 8, Feb. 23, 1953, p. 820-824.

Experimentally determined lattice constants for Cu_9Al_4, Cu_2O, and Cu_9Al_4 are compared with calculated values. Tables. (M26, N16, Al, Cu)

323-M. (French.) **Micrographic Investigation of the Structure of γ Iron by the Formation of a Layer of Oxides at Its Surface.** Jean Bardolle. *Comptes rendus*, v. 236, no. 18, May 4, 1953, p. 1790-1791.

Existence of true oxide grains whose surface densities and alignments vary from one crystal to another. Micrographs. (M23, Fe)

324-M. (French.) **The Emission Electron Microscope. Its Application to Metallurgical Research.** Albert Septier. *Revue de Métallurgie*, v. 50, no. 3, Mar. 1953, p. 208-214; disc., p. 214.

Principles of operation and examples of applications to metallurgical research. Diagrams, photographs. (M21)

325-M. (French.) **Electronic Theory of Metals.** Genevieve Sutra. *Comptes rendus*, v. 236, no. 25, June 22, 1953, p. 2391-2393.

Problem for AlCu, $AlCu_3$ and Cu_5Zn_8 in liquid and solid states. Graphs. (M25, Al, Cu, Zn)

326-M. (German.) **Difference in the Structures of Chromium Deposits Precipitated From Hydrofluoric-Acid, Fluosilicic-Acid, or Sulfuric Acid Electrolytic Baths.** R. Bilfinger. *Chemische Technik*, v. 5, no. 5, May 1953, p. 261-265.

Graph, photographs. (M27, Cr)

327-M. (German.) **Modern Methods of Microscopic Examination of Metallic Surfaces.** F. Gabler. *Metall*, v. 7, nos. 11/12, June 1953, p. 401-405.

Physical principles of light-field metallography. Dark-field and phase-contrast processes are considered. Photographs, diagrams. 25 ref. (M21, ST)

328-M. (French.) **Preparation and Chemical Anisotropy of Spherical Tin Monocrystals.** Giampaolo Bolognesi. *Comptes rendus*, v. 236, no. 25, June 22, 1953, p. 2414-2416.

Use of acids and KNO_3 to selectively etch the crystal on certain crystallographic planes. (M26, Sn)

329-M. (Swedish.) **Determination of Coarse Nonmetallic Inclusions in High Carbon Steel.** Govert Helmer. *Jernkontorets Annaler*, v. 137, no. 4, 1953, p. 128-139.

Amount of coarse slag inclusions can be approximately estimated in a modified stepdown turning test. Graphs, photographs, tables. (M28, CN)

N

Transformations and Resulting Structures

211-N. Carbide Precipitation, Secondary Hardening, and Red Hardness of High-Speed Steel. Kehsin Kuo. *Iron and Steel Institute, Journal*, v. 174, July 1953, p. 223-228.

Electrolytic extraction and X-ray powder methods. Tables. 20 ref. (N7, Q29, TS)

212-N. Diffusion in Metals. A. D. Le Claire. *Iron and Steel Institute, Journal*, v. 174, July 1953, p. 229-236.

Principal results obtained from experimental and theoretical work on diffusion in metals. 7 ref. (N1, Cu)

213-N. On the Solubility of Hydrogen in Certain Liquid Metals. Y. L. Yao. *Journal of Chemical Physics*, v. 21, July 1953, p. 1309-1309.

Behavior of metals can be divided into three rough groups. Concludes that trends permit estimations of unknown solubilities. (N12)

214-N. Influence of Aluminum and Silicon Deoxidation on the Strain Aging of Low-Carbon Steels. W. C. Leslie and R. L. Rickett. *Journal of Metals*, v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1021-1031.

Influence of deoxidation practice, prior thermal history, aging time, and temperature on the strain-aging behavior of low-carbon openhearth steels. Graphs, tables. 35 ref. (N7, Al, Si, CN)

215-N. Some Properties of Columbium Containing Nitrogen. Choh-Yi Ang and C. Wert. *Journal of Metals*, v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1032-1036.

Quench aging and its effects on physical and mechanical properties. (N7, P general, Q general, Co)

216-N. On the Mutual Transformation of Lattices. B. A. Bilby. *Philosophical Magazine*, v. 44, ser. 7, July 1953, p. 782-785.

Mutual transformation of lattices by homogeneous deformation and the transformation of Co. 5 ref. (N10, Co)

217-N. The Martensitic Transformation in Cobalt. Z. B. Basinski and J. W. Christian. *Philosophical Magazine*, v. 44, ser. 7, July 1953, p. 791-792.

Brief note. (N9, Co)

218-N. Heat Flow and the Growth of Metal Single Crystals From the Melt. A. J. Goss. *Physical Society, Proceedings*, v. 66, sec. B, pt. 7, July 1953, p. 525-532.

Theoretical analysis for heat flow in a crystallizing metal rod and three cases corresponding to slow, medium and fast rates of growth. Importance of heat flow on form and orientation of the crystals. Graphs. 18 ref. (N12)

219-N. (English.) Structure of the Allotropic Forms of Strontium. E. A. Sheldon and A. J. King. *Acta Crystallographica*, v. 6, pt. 1, Jan. 1953, p. 100.

Examined by X-ray powder technique. Sr was observed in three forms with transitions at 215±10° C. and 605±10° C. (N6, M22, Sr)

220-N. (English.) The Redistribution of Solute Atoms During the Solidification of Metals. W. A. Tiller, K. A. Jackson, J. W. Rutter, and B. Chalmers. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 428-437.

Quantitative analysis made of the redistribution of solute resulting from solidification of a binary solution for transient and steady state conditions. Diffusion in the liquid is shown to be of importance in determining the solute distribution in both the liquid and the solid. Values for length of the constitutionally supercooled zone of liquid adjacent to a growing solid-liquid interface are calculated. 9 ref. (N12)

221-N. (English.) The Theory of D_o in the Arrhenius Equation for Self-Diffusion in Cubic Metals. A. D. Le Claire. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 438-447.

Extends Zener's theory of D_o. Experimentally observed values of D_o and Q are consistent only with the supposition of a vacancy mechanism in face-centered metals and with a ring mechanism in body-centered cubic metals. 27 ref. (N1)

222-N. (English.) Mercury Whiskers. G. W. Sears. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 457-459.

Growth mechanism. (N12, Hg)

223-N. (English.) On the Debye Model and Low Temperature Phase Transformation in Lithium. W. DeSorbo. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 459-460.

Explanation for discrepancy between the Debye model and specific heat data below liquid air temperatures. 11 ref. (N6, Li)

224-N. (English.) Thermal Stabilization of Austenite in Nickel Steels. T. Ko and B. Edmondson. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 466-467.

Experiments compared with those of Morgan and Ko. (N8, AY)

225-N. (English.) The Orientation Relationships Between Cementite and α-Iron. N. J. Petch. *Acta Crystallographica*, v. 6, pt. 1, Jan. 1953, p. 96.

Precipitation of cementite in the tempering of martensite and its relation to a paper by Trillat and Oketani (1952). (N7, Fe)

226-N. (French.) Short Range Order in Substitutional Solid Solutions in Metals. Gerard Fournet. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 383-389.

Short range order always exists in substitutional solid solutions. Expressions are given for a very simple model. 15 ref. (N10)

227-N. (French.) The Effect of Nitrogen on the Properties of Cementite. R. Bridelle and A. Michel. *Revue de Métallurgie*, v. 50, no. 6, June 1953, p. 410-412.

Quasi-constancy of the parameters of cementite, the variation of the Curie point, and the effect of N on the stability of cementite and austenite. Graphs. 11 ref. (N8, M26, Fe)

228-N. (French.) Electron Diffraction Study of Aluminium-Copper Alloys Produced by Evaporation in Vacuo. Jean Jacques Trillat and Noboru Takahashi. *Revue de Métallurgie*, v. 50, no. 6, June 1953, p. 421-432.

Possibility of obtaining mixtures or definite phases of Al or Cu by evaporation of these metals or their alloys in a vacuum. Graphs, photographs. 5 ref. (N16, M22, Al, Cu)

229-N. (German.) Influence of Hydrogen Diffusion on Critical Total Reduction of Soft Carbon Steel. Friedrich Erdmann-Jesnitzer and Hermann Schumann. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, May-June 1953, p. 211-213.

Possibility of using atomic H to displace the amount of critical cold work proven experimentally. 7 ref. (N1, CN)

230-N. (German.) Diffusion-Grain Formation in Ferro-Alloys. Friedrich Erdmann-Jesnitzer, Hermann Schumann, and Manfred Beckert. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, May-June 1953, p. 215-227.

Proposes that diffusion of C into alpha-iron proceeds faster than into gamma-iron grains. Tests made on Fe-Al, Fe-Si, Fe-P, and Fe-Cr systems. Photographs, diagrams. 60 ref. (N1, Fe, Al, Si, Cr)

231-N. (German.) Crystallization of Cast Iron With Nodular Graphite. Erich Scheil and Leo Hutter. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, May-June 1953, p. 237-246.

Process and resulting properties. Photographs, graphs, diagrams. 41 ref. (N12, CI)

232-N. (German.) Separation Processes in Supersaturated Solid Solutions. Wolfgang Wepner. *Archiv für das Eisenhüttenwesen*, v. 24, no. 5-6, May-June 1953, p. 275-279.

Theoretical researches on Cottrell Bibby theory. New precipitation equation. Graphs. 12 ref. (N7)

233-N. (German.) Dislocations and Allotropic Changes. Alfred Seeger. *Zeitschrift für Metallkunde*, v. 44, no. 6, June 1953, p. 247-253.

Geometry of dislocations. Test results on allotropic change in Co, and dislocation mechanism for this change. Diagrams. 33 ref. (N6, Co)

234-N. (German.) Stability of Inorganic Compounds in a High Vacuum. M. Auwärter. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 1-7; disc., p. 7.

Processes taking place during the melting of inorganic compounds, particularly oxides in high vacuum, are demonstrated for a number of substances. Results lead to conclusion regarding the mechanism of melting and sintering of metals, alloys and metallic compounds in high vacuum. Diagrams, graphs. (N12)

235-N. (German.) Diffusion in Solid Metals. W. Seith. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 65-75; disc., p. 75-80.

New experimental results. Modern concept of the interchange mechanism as derived from the results. Special attention to conditions prevailing during sintering of metal powders. Diagrams, micrographs. 16 ref. (N1, H15)

236-N. (English.) The Solid Solubilities of Some Stable Carbides in Cobalt, Nickel, and Iron at 1250° C. R. Edwards and T. Raine. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 232-242; disc., p. 243.

Experimental procedure. Micrographs, tables. (N12, Co, Ni, Fe)

237-N. (German.) Formation of Solid Solutions in High-Temperature Melting Cermets. R. Kieffer. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 268-296; disc., p. 296.

Diffusion processes involved in the formation of solid solutions were studied by metallography and microhardness measurements. Diagrams, graphs, tables, micrographs. 39 ref. (N1)

238-N. (German.) Influence of Adsorbed Gases on the Bond Stability of Solid Bodies in the Surface Region. H. Forestier, J. Mauer, J. P. Kiehl, and P. Stahl. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 8-19; disc., p. 19-20.

Effect of gas adsorption on stability of crystal lattices. Experimental data permit theoretical interpretation. Graphs. 13 ref. (N1)

239-N. (English.) Investigations on Ternary Systems Me_1-Me_2-B, and a Discussion of the Relative Strength of the Bond Transition Metal-Boron. R. Kiessling. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 297-301; disc., p. 301-302.

Strength of bonds between transition metals and B. Applications to powder metallurgy. (M24, H general, B)

240-N. (Russian.) Determination of Diffusion Coefficients of Metals in Mercury. A. G. Stromberg. *Doklady Akademii Nauk SSSR*, v. 85, new ser., no. 4, Aug. 1, 1952, p. 831-834.

Application of amalgam polarography. Data are tabulated and charted. 5 ref. (N1, Hg, Cd, Pb, Zn, Tl, Bi)

241-N. (Russian.) Structural (Phase) Transformations in the Metalloceramic Composition Iron-Graphite During Sintering. V. I. Likhtman and I. N. Smirnova. *Doklady Akademii Nauk SSSR*, v. 86, new ser. no. 6, Oct. 21, 1952, p. 1151-1153.

Sintering was done in a high vacuum at 1000° C. for 1 hr. and in a N_2 medium at 110° C. for 10 min. Micrographs. 2 ref. (N6, H15, Fe)

242-N. (Russian.) Stabilization of Residual Austenite During Cold Treatment of Steel. A. P. Guliaev and M. S. Chaadaeva. *Vestnik Mashinostroeniia*, v. 33, no. 1, Jan. 1953, p. 37-42.

Effect of holding time of hardened steel at room temperature on austenite. Tables, graphs. (N8, AY)

243-N. (German.) Sorption Properties of Thin Nickel Layers. Werner Scheuble. *Zeitschrift für Physik*, v. 135, no. 2, 1953, p. 125-140.

Speaks of sorption of O_2 by steamed nickel layers. Amount of sorption depends on gas pressure in apparatus; penetrability is dependent on temperature. Effects of precoating with either H_2 or O_2 on sorption of these gases. Graphs. 9 ref. (N1, Ni)

244-N. (French.) Recrystallization of Pure Iron by Polygonization. Jean Talbot, Christian De Beaulieu and Georges Chaudron. *Comptes rendus*, v. 236, no. 8, Feb. 23, 1953, p. 818-820.

Pure Fe was rolled to a thickness of 0.2 mm. The test pieces were annealed for 24 hr. at 920° in a current of pure, dry H and elongated 3%. Results and subsequent test. 8 ref. (N5, Fe)

245-N. (German.) **The Allotropy of the Metalloids.** Heinz Krebs. *Angewandte Chemie,* v. 65, no. 11, June 1953, p. 293-299.

Allotropic behavior of Se, S, Te, P, As, Sb, Bi, C, Si and Ge, their lattice structures and the conditions under which they change from one modification into another. Diagrams, graphs, tables. (N6, M26, Se, S, Te, P, As, Sb, Bi, C, Si, Ge)

P

Physical Properties and Test Methods

399-P. Low Temperature Heat Capacities of Inorganic Solids. XVII. Heat Capacity of Titanium from 15 to 305° K. Charles W. Kothen and Herrick L. Johnston. *American Chemical Society, Journal,* v. 75, July 5, 1953, p. 3101-3102.

Thermal functions are calculated and tabulated over above range. Entropy at 298.16° K. is 7.33±0.02 e.m. (P12, Ti)

400-P. The Heat of Combustion of Lanthanum. Elmer J. Huber, Jr. and Charles E. Holley, Jr. *American Chemical Society, Journal,* v. 75, July 20, 1953, p. 3594-3595.

Determined by oxidation at 25 atmospheres pressure in an O_2 bomb calorimeter. Value determined to be 6439.2±2.9 joules per gram. (P12, La)

401-P. The Anomalous Skin Effect and the Reflectivity of Metals. Evaluation of the Integrals Appearing in the Expressions for the Surface Impedance. R. B. Dingle. *Applied Scientific Research,* v. 3, sec. B, 1953, p. 69-99.

Theoretical analysis. (P17)

402-P. On the Geometrical Arrangement in Hall Effect Measurements. V. Frank. *Applied Scientific Research,* v. 3, sec. B, 1953, p. 129-140.

Short-circuiting effect of current electrodes in Hall effect measurements is given for an arbitrary geometrical arrangement. Shows that (for singly connected geometries) the correction to be applied is given by a universal function of only one parameter which is characteristic of the geometry and which can be determined by measurement. Theory is experimentally verified for a particular geometry by measurements on Cu. Diagrams. (P15, Cu)

403-P. Note on Some Neutron Capture γ-Rays From Magnesium. B. B. Kinsey and G. A. Bartholomew. *Canadian Journal of Physics,* v. 31, July 1953, p. 901-902.

Describes experiments. (P13, Mg)

404-P. A Method of Determining Electrical Resistivities at Low Temperatures. David C. Baird and Willard S. Boyle. *Journal of Applied Physics,* v. 24, July 1953, p. 958.

Method to correlate thermal and electrical conductivities of certain Cu specimens at liquid He temperatures. Graphs. (P11, P15, Cu)

405-P. Effect of Particle Size on Magnetic Loss Tangent of Obstacle Type Artificial Dielectrics. J. M. Kelly and J. O. Stenoien. *Journal of Applied Physics,* v. 24, July 1953, p. 962-963.

Behavior of Al powder suspended in a dielectric binder. Photomicrographs and graph. (P16, H11, Al)

406-P. The Specific Heat of Crystalline Selenium at Low Temperatures. Warren Desorbo. *Journal of Chemical Physics,* v. 21, July 1953, p. 1144-1148.

Tests were made down to 15° K. Values agree to 37° K. but show anomalies below this. Entropy, enthalpy, and free energy are tabulated to 300° K. (P12, Se)

407-P. A Study of the Formation of Iron Percarbide. John J. Mitchell. *Journal of Chemical Physics,* v. 21, July 1953, p. 1153-1159.

$C^{14}O_2$ used at temperatures from 170 to 321° C. shows that percarbide (Fe_2C) forms on scattered nuclei. C is firmly held and surface of partially carbided iron is covered by percarbide. (P13, Fe)

408-P. Charge-Transfer No-Bond Adsorption of Inert Atoms or Molecules on Metals. J. C. P. Mignolet. *Journal of Chemical Physics,* v. 21, July 1953, p. 1298.

Describes above for gases such as He, Ne, A, Kr, and Xe on K, Ca, Ti, Cr, Fe, Ni, Zn, Se, W and Hg. Results are explained on basis of a donor-acceptor interaction. (P15, Ti, Cr, Fe, Ni, Zn, Se, W, Hg)

409-P. Thermal Conductivity of Nodular Iron. M. J. Sinnott. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1016.

Data on conductivity of five irons. Tables. 4 ref. (P11, Fe)

410-P. Silicon-Oxygen Equilibrium in Liquid Iron. A Revision. John Chipman and Nev A. Gokcen. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1017-1018.

Revised relation between concentration of silicon and activity coefficient of oxygen in liquid iron. New values of thermodynamic properties of the liquid solution. 10 ref. (P12, Fe, Si)

411-P. Some Thermal Properties of Point-Contact Germanium Diodes. J. R. Tillman and J. C. Henderson. *Philosophical Magazine,* v. 44, ser. 7, July 1953, p. 677-696.

Experimental methods and resulting data. Diagrams, graphs. 10 ref. (P11, P15, Ge)

412-P. The Electrical Resistivity of Liquid Iron. R. W. Powell. *Philosophical Magazine,* v. 44, ser. 7, July 1953. p. 772-775.

Compares the resistivity in molten and solid state. Graph. 6 ref. (P15, Le)

413-P. Heat Conductivities of Superconductive Sn, In, Tl, Ta, Cb, and Al Below 1° K. K. Mendelssohn and C. A. Renton. *Philosophical Magazine,* v. 44, ser. 7, July 1953, p. 776-781.

Graphs. 10 ref. (P11, Sn, In, Tl, Ta, Cb, Al)

414-P. Experimental Confirmation of Relation Between Pulse Drift Mobility and Charge Carrier Drift Mobility in Germanium. M. B. Prince. *Physical Review,* v. 91, ser. 2, July 15, 1953, p. 271-272.

Graphs. 5 ref. (P15, Ge)

415-P. Electron Current in Thin Oxide Films on Aluminium. A. Charlesby. *Physical Society, Proceedings,* v. 66, sec. B, pt. 7, July 1953, p. 533-541.

Relationship between electron current, voltage across the film, film thickness and temperature. Tables, graphs. (P15, Al)

416-P. Injected Absorption in Germanium. A. F. Gibson. *Physical Society, Proceedings,* v. 66, sec. B, pt. 7, July 1953, p. 588-596.

Basic transistor action was studied as a function of wave length, injected current, frequency, and other relevant parameters. Theory is discussed and agreement found with experimental results. Graphs. (P15, Ge)

417-P. Thermal Effects Accompanying Magnetization of a Ferrimagnetic Material. L. F. Bates and N. P. R. Sherry. *Physical Society, Proceedings,* v. 66, sec. B, pt. 7, July 1953, p. 609-610.

Measurements made on thermal changes which occur when a ferromagnetic metal or alloy goes through an ordinary hysteresis cycye. (P11, P16, SG-n, p)

418-P. The Influence of Domain Structure on the Magnetization Curves of Single Crystals. E. W. Lee. *Physical Society, Proceedings,* v. 66, pt. 7, July 1953, p. 623-630.

By using Néel's model for the domain structure of a single crystal of Fe, magnetization curves were calculated. Calculated curves were compared with experimental results of Williams. Diagrams. (P16, Fe)

419-P. The Thermal Conductivity of Metals in High Magnetic Fields at Low Temperatures. K. Mendelssohn and H. M. Rosenberg. *Royal Society, Proceedings,* v. 218, ser. A, June 1953, p. 190-205.

Measurements between 2 and 4.5° K. of 27 pure metals subjected to a magnetic field of 4kOe. Graphs. 24 ref. (P11, P16)

420-P. A Theoretical Calculation of the Stored Energy in a Work-Hardened Material. A. N. Stroh. *Royal Society, Proceedings,* v. 218, ser. A, July 7, 1953, p. 391-400.

Evaluates energy due to piled-up groups. Graphs, tables. 22 ref. (P12)

421-P. (English.) Thermodynamic Activities in Iron-Nickel Alloys. R. A. Oriani. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 448-454.

Fe activity in Fe-Ni alloys was studied in differential apparatus by equilibrating mixtures of H_2O/H_2 gases over pure Fe and alloys. Tables, graphs. 20 ref. (P12, Fe, Ni)

422-P. (English.) Spin-Orbit Coupling Effects in Ferromagnetic Metals. G. C. Fletcher. *Acta Metallurgica,* v. 1, no. 4, July 1953, p. 467-468.

Experiments using Ni. (P16, Ni)

423-P. (French.) Thermal Conductivity in Furnace Construction Materials. Antonio Rasi. *Chaleur & Industrie,* v. 34, no. 334, May 1953, p. 117-123.

In connection with degree of porosity, weight, specific gravity, moisture absorption and cost. Tables, diagrams, graphs. 12 ref. (P11)

424-P. (French.) Magnetic Properties and the Distribution of Electrons in Some Alloys and Compounds. G. Foex. *Helvetica Physica Acta,* v. 26, nos. 3-4, 1953, p. 199-206.

Experimental work. Tables, graphs. 12 ref. (P16, SG-n)

425-P. (German.) Materials Testing With Gamma and Beta Rays. II. Gamma-Ray Emitting Products and Their Handling; Protection Against Radiation. E. A. W. Müller. *Archiv für technisches Messen,* no. 209, June 1953, p. 131-134.

Radioactive Ir, Ta and Co products. Effect of atomic radiation on the human body and protective measures. Tables, photographs. (P13, S19, Ir, Ta, Co)

426-P. (German.) Determining the Surface Tensions of Several Types of Cast and Pig Iron. K. Grütter and B. Marincek. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 6, June 1953, p. 171-173.

Method of measuring above. Graphs, tables. 11 ref. (P10, Fe)

427-P. (German.) Excitation Conditions of Titanium by Aid of γ-γ Angle Correlation. Peter Meyer and Siegfried Schlieder. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 119-124.

Shows first excitation to possess spin 2, the second, spin 4, both transitions taking place by quadrupole radiation. Diagrams, graphs. 17 ref. (P10, Ti)

428-P. (German.) **Electron Emission by Metals as an Aftereffect of Irradiation.** Karlheinz Seeger. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 152-162.

Emission measurements of metals after irradiation by X-rays; ultraviolet and visible light; and after luminous discharge. Dependencies on time, temperature, wave length of radiation and surface structure of metal. Graphs. 40 ref. (P10)

429-P. (German.) **Meaning of Optical Constants of the Alkali Metals.** Herwig Schopper. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 163-167.

Shows that experimental and theoretical values of the constants can be brought to agreement. Free electrons/cm^3 and vaporization constants can be computed from the experimental values. 17 ref. (P17, EG-e)

430-P. (German.) **The Chemical Bond in Monocarbides and Its Correlation to Hardness.** H. Nowotny and F. Vitovec. Paper from "Plansee Proceedings 1952". Metalwerk Plansee Ges. M. B. H., p. 39-48; disc., p. 48.

Theories of bonding in lattices of intermetallic phases. Investigates to what extent simple relationships can be expected between the type of bonding and specific properties such as hardness. Diagrams. 25 ref. (P13, Q29)

431-P. (Russian.) **Properties of Superconductive Films of Tl and In.** N. V. Zavaritskii. *Doklady Akademii Nauk SSSR,* v. 85, new ser. no. 4, Aug. 1, 1952, p. 749-752.

Studies were made in a magnetic field. Graphs. 5 ref. (P15, Tl, In)

432-P. (Russian.) **Solubility and Activity of Oxygen in Iron and Vanadium Melts.** R. A. Karasev, A. Iv. Poliakov and A. M. Samarin. *Doklady Akademii Nauk SSSR,* v. 85, new ser. no. 6, Aug. 21, 1952, p. 1313-1316.

Experimental and theoretical data. 4 ref. (P12, Fe, Va)

433-P. (Russian.) **Thermal Diffusion in Metals.** I. A. Oding. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 1, Sept. 1, 1952, p. 67-70.

Basic principles. 4 ref. (P12)

434-P. (Russian.) **Temperature Dependence of Surface Tension of Bismuth and Its Alloys With Sodium and Potassium.** P. P. Pugachevich and I. P. Altynov. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 1, Sept. 1, 1952, p. 117-119.

Drop method was used. Glass apparatus. Graphs. 9 ref. (P12, Bi, Na, K)

435-P. (Russian.) **Superconductivity of Bismuth.** N. V. Zavaritskii. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952. p. 687-690.

Films of Ag, Cu, Mg, Sb, and Bi condensed on glass surface at 2° K. were studied. 7 ref. (P15, Bi, Ag, Cu, Mg, Sb)

436-P. (Russian.) **Basic Types of Composition — Heat Resistance Diagrams of Metallic Substances.** I. I. Kornilov. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 721-724.

Three types of diagrams distinguished by the use of continuous, limited and very limited solid solutions. It was found that heat resistance of solid solution alloys is greater than that of heterogeneous alloys. (P11, SG-h)

437-P. (Russian.) **Effect of pH on Electrochemical Behavior and Corrosion Resistance of Metals.** A. Ia. Shatalov. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 775-777.

Measurements of electrode potentials of 12 metals. (P15, R general, Ag, Cu, Mg, Zn, Cd, Al, Pb, Sn, Bi, Mo, W, Mn)

438-P. (Russian.) **Variation of Electric Resistance and of Thermal Electromotive Force of the Alloy Fe_3Pt in Longitudinal and Transverse Magnetic Fields.** R. G. Annaev and M. V. Kolodin. *Doklady Akademii Nauk, SSSR,* v. 87, new ser. no. 2, Nov. 11, 1952, p. 195-196.

After tempering at 1000° C. in vacuum for 2 hr., the galvanomagnetic effects remained the same. Graphs, 6 ref. (P15, P11)

439-P. (English.) **The Magnetoresistances of Alloys of a Noble Metal and a Transition Metal at Low Temperatures.** A. N. Gerritsen. *Physica,* v. 19, nos. 1-2, Jan.-Feb. 1953, p. 61-73.

Resistance of dilute alloys of Cu and Au with Mn and Cr were measured in magnetic fields. Tables, graphs. 10 ref. (P16, Cu, Au, Mn, Cr)

440-P. (English.) **Magnetic Compounds With Perovskite Structure. III. Ferromagnetic Compounds of Cobalt.** G. H. Jonker and J. H. Van Santen. *Physica,* v. 19, nos. 1-2, Jan.-Feb. 1953, p. 120-130.

Polycrystalline solid solutions of (La, Sr) CoO_3 were prepared and tested. Tables, graphs, diagrams. 9 ref. (P16, Co)

441-P. (English.) **The Anomalous Skin Effect and the Reflectivity of Metals. I.-II. Comparison Between Theoretical and Experimental Optical Properties.** R. B. Dingle. *Physica,* v. 19, no. 4, Apr. 1953, p. 311-364.

Part I: attempt is made to extend and improve the evaluation of Reuther and Sondheimer's formal expressions. Part II: Numerical magnitudes of the parameters and derived quantities for actual metals. Compares theoretical results with existing experimental data. Tables. 47 ref. (P17, Na, Cu, Ag, Au, Pt, W, Al, Pb, Sn)

442-P. (English.) **A Method for the Measurement of the Thermal Expansion of Solids Between 0 and −180° C.** A. Michels, T. Wassenaar, and Th. N. Zwietering. *Physica,* v. 19, no. 4, Apr. 1953, p. 371-373.

Method allows a rapid determination of the coefficient of linear expansion of a solid. Diagrams. (P11)

443-P. (English.) **The Cooperative Electron Phenomenon in Dilute Alloys.** J. Korringa and A. N. Gerritsen. *Physica,* v. 19, no. 6, June 1953, p. 457-507.

Electrical resistance as function of temperature, concentration and strength of magnetic field. Graphs, tables. 17 ref. (P15, P16, Al, Cu, Ag, Mg, Au)

444-P. (Dutch.) **Copper and Copper Alloys. II. Malleable Phosphorus-Bronze Alloys.** W. G. R. de Jager. *Metalen.* v. 8, no. 11, June 15, 1953, p. 234-235.

Physical, electrical, thermal and corrosion properties. Tables. (P general, R general, Cu)

445-P. (French.) **Study of Infrared Photoluminescence of Activated Cadmium Sulfide in Copper.** Edmond Grillot and Pierre Guintini. *Comptes rendus,* v. 236, no. 8, Feb. 23, p. 802-804.

Experimental data. Graph, diagram. 5 ref. (P17, Cu, Cd)

446-P. (French.) **Deviations From Ohm's Law When Very Thin Metallic Plates Are Studied.** Marcel Perrot and Jean-Pierre David. *Comptes rendus,* v. 236, no. 17, Apr. 27, 1953, p. 1641-1643.

Deviations observed in a vacuum at low and ordinary temperatures. (P15)

447-P. (French.) **Chemical Aspect of the Electroconductivity of Metals and Alloys.** Genevieve Sutra. *Comptes rendus,* v. 236, no. 17, Apr. 27, 1953, p. 1643-1645.

Tabulated data of temperature coefficients for Al-Cu alloys. (P12, P15, Al, Cu)

448-P. (German.) **Permanent Magnets and Their Practical Application.** H. Fahlenbrach. *Metall,* v. 7, nos. 11/12, June 1953, p. 413-421.

Theoretical fundamentals of magnetic materials with special attention to their use in machine construction. Diagrams, graphs, photographs. 8 ref. (P16, 17, ST)

449-P. (German.) **Thermo-Electric Effects in Stressed Metals.** W. Späth. *Metall,* v. 7, nos. 11/12, June 1953, p. 430-432.

History, orientative experiments, principles of Seebeck and Peltier effects and processes occurring in stressed metals. Diagrams. 8 ref. (P15)

450-P. (Russian.) **Curves of Simultaneous Magnetization by Direct and Alternating Current Fields.** I. B. Negenvitskii, I. K. Panina, and V. P. Mishchenko. *Elektrichestvo,* no. 3, Mar. 1953, p. 63-64.

Curves are presented for "Permalloy" and Steel E 4A. (P16, AY, SG-n)

451-P. (Russian.) **Determination of the Speed of Component Distribution in a Liquid Metal.** M. M. Karnaukhov and S. K. Chuchmarev. *Izvestiia Akademii Nauk SSSR. Otdelenie Tekhnicheskikh Nauk,* no. 1, Jan. 1953, p. 82-95.

Based on the ability of radioactive substances to radiate gamma rays. Diagrams, tables, graphs. 4 ref. (P10)

452-P. The Activities of Evaporated Metal Films in Gas Chemisorption. B. M. W. Trapnell. *Royal Society, Proceedings,* v. 218, ser. A, July 23, p. 566-577.

General mechanisms of chemisorption by later metals of transition periods, mainly those of group VIII. Table, graphs. 28 ref. (P12)

453-P. (German.) **Analysis of Angle-Correction Experiment With a Report of Such Measurements on Nickel.** Santimay Chatterjee and Ajit Kumar Saha. *Zeitschrift für Physik,* v. 135, no. 2, 1953, p. 141-151.

Analyzes assumptions for measuring corrective relationships of the various deterioration rays emitted by an active nucleus. Means of getting more accurate results are suggested. Diagrams, tables. 10 ref. (P13, Ni)

Q Mechanical Properties and Test Methods; Deformation

658-Q. The Stresses in the Reels of Cold Reduction Mills. R. B. Sims and J. A. Place. *British Journal of Applied Physics,* v. 4, July 1953, p. 213-216.

Investigation of stresses, adaptation of Inglis's theory. Photographs, graphs. (Q25)

659-Q. Avoid Crankshaft Failures. *Diesel Power and Diesel Transportation,* v. 31, July 1953, p. 80-82.

Failures due to bending and torsion. Inspection procedures. Photographs. (Q5, Q1, S general, CN)

660-Q. Possibility of Error in Poisson's Ratio for Steel. W. D. Manley. *Engineers' Digest,* v. 14, July 1953, p. 256.

Condensed from the original in *Iron Age.* See item 364-Q, 1953. (Q21, CN)

661-Q. Design of Low Frequency Fatigue Testing Machines. C. V. Joga Rao and L. S. Sreenath. *Indian Institute of Science, Journal,* v. 35, Apr. 1953, p. 87-92.

Two types of equipment. Diagrams, photographs. (Q7)

662-Q. Investigation of Stresses Around a Hole in Thin Rotating Disks of Hyperbolic and Parabolic Profiles. S. Kumar and C. V. Joga Rao. *Indian Institute of Science, Journal,* v. 35, Apr. 1953, p. 93-102.

Theoretical analysis. Diagrams. (Q25)

663-Q. The Properties of Cast Chromium Alloys at Elevated Temperatures. I. The Melting and Casting of Chromium-Rich Alloys. A. H. Sully, E. A. Brandes, and A. G. Provan. **II. Some Properties of Certain Binary Chromium-Rich Alloys.** A. H. Sully and E. A. Brandes. **III. The Creep Properties of Ternary and More Complex Chromium-Base Alloys.** A. H. Sully and E. A. Brandes. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 569-584.

Tables, diagrams, graphs. 18 ref. (Q general, E general, Cr)

664-Q. The Effect of Temperature and Purity on the Ductility and Other Properties of Chromium. A. H. Sully, E. A. Brandes, and K. W. Mitchell. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 585-598.

Preparing pure Cr, mechanical testing, fracture and deformation characteristics. Graphs, tables. 26 ref. (Q general, Cr)

665-Q. The Stepped Stress-Strain Curve of Some Aluminium Alloys. N. Krupnik and Hugh Ford. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 601-615.

Tensile tests were made with four Al alloys pulled at constant rates of either loading or straining to establish basic yield-stress curves. Tables, diagrams, graphs. 11 ref. (Q27, Al)

666-Q. Discontinuous Flow and Strain-Ageing in a 6% Tin Phosphor-Bronze. N. H. Polakowski. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 617-624.

Tension tests were carried out on 0.2-in. diam. alpha-bronze rods after various initial treatments. Effects of grain size, strain rate, rate of cooling from the annealing temperature, kind and amount of prestrain, state of residual stress in the metal, aging treatment, and testing temperature on deformation properties. Diagrams. 20 ref. (Q27, Cu)

667-Q. Yield-Point Phenomena and Stretcher-Strain Markings in Aluminium-Magnesium Alloys. V. A. Phillips, A. J. Swain, and R. Eborall. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 625-647.

Formation of stretcher-strain markings in Al-Mg alloys was correlated with the stress-strain diagram. Tables, diagrams, graphs. 48 ref. (Q27, Al, Mg)

668-Q. Effect of Composition and Heat-Treatment on Yield-Point Phenomena in Aluminium Alloys. V. A. Phillips. *Institute of Metals, Journal,* v. 81, Aug. 1953, p. 649-661.

Discontinuous yielding was studied in commercial Al and some common alloys not containing large amounts of Mg. Tables, graphs. 11 ref. (Q27, J general, Al)

669-Q. Measurements of Stacking Faults in Cold-Worked Alpha Brass. B. E. Warren and E. P. Warekois. *Journal of Applied Physics,* v. 24, July 1953, p. 951-952.

Peak separation resulting from stacking faults. Graph. (Q24, Cu)

670-Q. Deduction of the Maximum Torsional Stress in a Shaft With Notches. Sennosuke Momma. *Journal of Applied Physics,* v. 24, July 1953, p. 959-960.

Solution for a twisted shaft with circumferential notches periodically situated along its length. Graphs. (Q1)

671-Q. Isothermal Temper Embrittlement of SAE 3140 Steel. F. L. Carr, M. Goldman, L. D. Jaffe, and D. C. Buffum. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 998.

Data on embrittlement around 525° C. Table, diagram. 5 ref. (Q23, AY)

672-Q. Plastic Bending of Zinc Crystals. G. P. Conard II, B. L. Averbach, and Morris Cohen. *Journal of Metals,* v. 5, Aug. 1953; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 197, 1953, p. 1036-1038.

Effect of bending on the crystal formation. 5 ref. (Q5, Zn)

673-Q. Mechanical Properties of Steel. *Machine and Tool Blue Book,* v. 49, Aug. 1953, p. 209, 211, 213.

Tabulated data. (Q general, ST)

674-Q. Data for Structural Design in H10 Alloy. M. Bridgewater. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 304-308.

Properties and applications. Graphs, tables. (Q general, Al)

675-Q. Recent Researches on Aluminium and Its Alloys. Influence of Grain Size and Purity on Mechanical Properties. D. C. G. Lees. *Metal Treatment and Drop Forging,* v. 20, July 1953, p. 293-299, 306.

Investigations on factors influencing cast structure and their effect on mechanical properties. Recent advances in stud welding, stud hardening, and flame and arc cutting. 18 ref. (Q general, K1, G22, Al)

676-Q. Variation of the Incompressibility of an Elastic Material Subjected to Large Hydrostatic Pressure. A. Keane. *Nature,* v. 172, July 18, 1953, p. 117-118.

Two formulas for calculation of incompressibility, based on Birch's and Murnaghan's theory. Table. 3 ref. (Q28)

677-Q. Brittle Coatings for Use in Stress Analysis Under Varying Temperature Conditions. Fred N. Singdale. *Nondestructive Testing,* v. 11, July 1953, p. 37-39.

Advantages of stress-indicating enamels. Photographs. (Q25)

678-Q. A Single Crystal Extensometer. A. J. Kennedy. *Review of Scientific Instruments,* v. 24, July 1953, p. 505-507.

Mechanism which, when loaded with a constant weight, maintains constant stress on the slip planes of a single crystal extending under creep. Diagrams. 14 ref. (Q3)

679-Q. Deformations and Stresses in Symmetrically Loaded Circular Plates of Varying Thickness. D. C. Boston. *Royal Aeronautical Society, Journal,* v. 57, July 1953, p. 449-454.

Theoretical analysis. Graphs, diagrams. (Q25)

680-Q. Substructure of Metals Determines Elastic Behavior. Norman P. Goss. *Steel,* v. 133, Aug. 3, 1953, p. 130. (Q21)

681-Q. New Aluminum-Tin Bearing Alloys. *Tin and Its Uses,* June 1953, p. 2-4.

Production method permitting higher Sn contents combined with high fatigue strength in bearing alloys. Table, photographs. (Q7, C general, Al, Cu, Sn)

682-Q. Statistical Aanlysis of Behavior in the Transition Temperature Zone. R. W. Vanderbeck, H. D. Wilde, R. W. Lindsay, and C. Daniel. *Welding Journal,* v. 32, July 1953, p. 325S-332S.

Investigations determining notch toughness of steel at various temperatures. Graphs, tables. 7 ref. (Q23, ST)

683-Q. Mechanics of the Explosion Bulge Test. Carl E. Hartbower. *Welding Journal,* v. 32, July 1953, p. 333S-341S.

Semiworks-scale test of weldments featuring simple geometry and biaxial loading. Diagrams, graphs, photographs. 5 ref. (Q6, K9, CN)

684-Q. Further Developments in the Measurement of the Coefficient of Static Friction. H. Dean Baker, W. Claypoole, and D. D. Fuller. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 23-29.

Frictional phenomena in a system where the thickness of the oil film is of the order of molecular dimensions. Sensitive friction tester was rearranged to provide for automatic photographic recording of results. Graphs. 13 ref. (Q9)

685-Q. Statistical Mechanics of Complex Vibrating Systems. Sanford P. Thompson. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 49-56.

Preliminary report on an attempt to use the methods of statistical mechanics for making useful engineering predictions about the vibrations of complex mechanical systems whose structure is considered known but whose excitations are governed only by probability distributions. (Q9, S12)

686-Q. Transverse Vibration of One-and of Two-Span Beams Under the Action of a Moving Mass Load. Robert S. Ayre, Lydik S. Jacobsen, and Chieh Su Hsu. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 81-90.

Effect of varying the ratio of the weight of the load to the weight of one span of the beam. A quantitative comparison of the known cases of the single-span beam was related to the 2-span beam. Diagrams, graphs. 16 ref. (Q9)

687-Q. Structural Damping in a Simple Built-Up Beam. T. H. H. Pian and F. C. Hallowell, Jr. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 97-102.

Basic theory for the bending of a simple built-up beam with thin splicing or reinforcing spar caps. Relationships between load and deflection and between amplitude of load and friction loss in the course of cyclic loadings. Diagrams. (Q8)

688-Q. Critical Speeds of Uniform Shafts Under Axial Torque. Michael Golomb and R. M. Rosenberg. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 103-110.

Effect of axial torques on the critical speeds of uniform shafts with round cross section. Problem is solved in detail for shafts in self-aligning and in rigid-end bearings. (Q1)

689-Q. Coefficients of Irregularity of a Rotating System Considering Torsional Elasticity of the Shaft. Arthur P. Boresi. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 111-117.

Method for calculating coefficients of irregularity in a complex torsional system. System consists of an impeller, a generator and a diesel-engine set in which the driving and driven shafts are connected by a flexible coupling. Tables and curves. (Q1)

690-Q. Some Observations on Elastic Stability. J. N. Goodier. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 193-202.

Buckling according to nonlinear characteristics; lateral buckling of bars. Diagrams. 12 ref. (Q21, Q28)

691-Q. Non-Linear Vibration Problems Treated by the Averaging Method of W. Ritz. K. Klotter. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 125-131.

Method for obtaining quantitative information concerning steady-state vibrations governed by nonlinear differential equations. 9 ref. (Q9)

692-Q. Transverse Impact of Long Beams, Including Rotary Inertia and Shear Effects. M. A. Dengler and M. Goland. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 179-186.

Analysis of the effects of impact on a long beam by a concentrated load. 13 ref. (Q6)

693-Q. A One-Dimensional Theory of Compressional Waves in an Elastic Rod. R. D. Mindlin and G. Herrmann. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 187-191.

Energy considerations, stress and displacement equations of motion, waves in an infinite bar, and equation of axial motion. Graphs. (Q28)

694-Q. Effects of an Oscillating Tangential Force on the Contact Surfaces of Elastic Spheres. R. D. Mindlin, W. P. Mason, T. F. Osmer, and H. Deresiewicz. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 203-208.

Diminishing and oscillating tangential force and experimental tests. (Q21)

695-Q. On the Axisymmetric Problem of Elasticity Theory for a Region Bounded by Two Concentric Spheres. E. Sternberg, R. A. Eubanks, and M. A. Sadowsky. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 209-215.

Exact series solution in explicit form for the stresses and displacements in a spherical shell under arbitrary axisymmetric surface tractions. Solution is based upon the Boussinesq stress-function approach referred to spherical co-ordinates. 18 ref. (Q21)

696-Q. A Method for the Solution of the Restrained Cylinder Under Compression. E. D'Appolonia and N. M. Newmark. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 217-226.

Numerical method which can be applied to stress solutions of most radially symmetric problems. Diagrams. 7 ref. (Q28)

697-Q. The Stresses Around a Small Opening in a Beam Subjected to Bending With Shear. S. R. Heller, Jr. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 239-245.

Exact solution for the stress distribution around a small opening in the web of a beam subjected to bending with shear. Maximum stress concentration factors are compared with those for similar openings subjected to tension, shear, and pure bending, as well as for similar cases of simpler geometry. Diagrams, graphs. 8 ref. (Q2, Q5, Q25)

698-Q. Thermal Stresses in Perforated Plates. G. Horvay. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 247-257.

Method for the analysis of perforated plates of triangular layout when the loading is applied in the plane of the plate. Method is applied to the determination of the stresses and distortions that result in a tube sheet, supported by six radial spokes from an outer shell, when the temperature of the sheet is lowered below the temperature of the shell. Diagrams, graphs. (Q25)

699-Q. On the Estimation of Torsional Rigidity and Other Physical Quantities. J. B. Diaz. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 259-263.

Special case of the estimation of torsional rigidity using previous results on quadratic integrals. (Q1)

700-Q. The Effect of Initial Twist on the Torsional Rigidity of Thin Prismatical Bars and Tubular Members. Chen Chu. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 265-269.

Simple approximate method to evaluate the increase of torsional rigidity due to the presence of initial twist. (Q1)

701-Q. A Theory of Twisted Bourdon Tubes. Chen Chu. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 271-280.

General theory of the twisted Bourdon tube to predict its elastic behavior as a pressure-responsive element. Diagrams, graphs. (Q21, Q1)

702-Q. On the Application of Trigonometric Series to the Twisting of I-Type Beams. John E. Goldberg. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 281-283.

Twisting of I-type beams which are free to warp at the ends and are subjected to one or more torsional loads applied at intermediate locations. (Q1)

703-Q. Studies in Three-Dimensional Photoelasticity. Max M. Frocht and Roscoe Guernsey, Jr. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 301-307.

Method which, in conjunction with the "freezing and slicing" technique, makes it possible to determine six independent stress components at any point in a general 3-dimensional body. Diagrams. 12 ref. (Q25)

704-Q. Stress Distribution in Plates Under a Uniaxial State of Stress, With Multiple Semicircular and Flat-Bottom Notches. A. J. Durelli, R. L. Lake and E. Phillips. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 309-315.

Method of determining the stress on free boundaries by means of the brittle coating technique, together with the determination of principal stresses across the plate width by using a combination of photo-elastic and brittle coating data. Diagrams, graphs. (Q25)

705-Q. Photoelastic Determination of Stresses on the Surface of Poppet Valves. M. M. Lenven and M. M. Frocht. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 317-324.

Investigation of stresses for three basic types of head design using relatively large Fosterite models and the method of "stress-freezing and slicing". Diagrams, graphs, stress patterns. (Q25)

706-Q. Surface Stress Singularities Resulting From Various Boundary Conditions in Angular Corners of Plates Under Bending. M. L. Williams. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 325-329.

Investigation and results. Simple semi-empirical formula for the stresses along the edges of a plate of polygonal planform. (Q5, Q25)

707-Q. Circular and Rectangular Plates Under Lateral Load and Supported by an Elastic Solid Foundation. Gerald Pickett and Frank J. McCormick. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 331-338.

Bending of thin plates of finite size, supported in a horizontal plane by an elastic solid foundation. Graphs. (Q5)

708-Q. Large Deflections of Rectangular Plates. M. Stippes. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 339-345.

Investigation in which the membrane stresses are not neglected. Procedure for obtaining the solutions of equations for a class of boundary conditions. (Q25, Q5)

709-Q. The Effective Width of a Circular Cylindrical Shell Adjacent to a Circumferential Reinforcing Rib. Bruno Thürlimann, Rudolf O. Bereuter, and Bruce G. Johnston. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 347-356.

Analytical and experimental study of thin cylindrical shells reinforced with ribs in the circumferential direction. Diagrams, graphs. 12 ref. (Q25)

710-Q. Determination of the Effective Width of Plates With Small Deviations From Flatness by the Method of Split Rigidities. P. P. Bijlaard. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 357-362.

Results of investigation. 8 ref. (Q25)

711-Q. A Numerical Method for the Solution of Plate Buckling Problems. W. J. Austin and N. M. Newmark. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 363-371.

Numerical method for the solution of problems concerned with buckling of flat rectangular plates under conditions for which the usual partial differential equation of equilibrium can be reduced to an ordinary differential equation. (Q28)

712-Q. On the Optimum Distribution of Material in Sandwich Plates Loaded in Their Plane. P. P. Bijlaard. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 373-380.

Investigation to find properties of future materials that would be most

desirable for use in the core of sandwich plates that are loaded by forces in their own plane. Only isotropic material and elastic buckling were considered. Diagrams. (Q23)

713-Q. Bending and Buckling of Rectangular Sandwich Plates. A. Cemal Eringen. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 381-390.

Four partial differential equations for the bending and buckling of rectangular, flat sandwich plates having homogeneous cores subjected to various types of loading and boundary conditions using the theorem of minimum total potential. Graphs. 16 ref. (Q28, Q5)

714-Q. Torsional Instability of a Long Sandwich Cylinder. George Gerard. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 391-394.

Analysis of a sandwich element in which the core material was considered to be isotropic and the bending rigidity of the faces about their own middle surface was assumed to be negligible. 7 ref. (Q5, Q1)

715-Q. Elastic Instability of Deep Cantilever Struts Under Combined Axial and Shear Loads at the Free End. Harold C. Martin. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 395-402.

Investigation of failure by elastic instability, due to the combined action of the applied loads. Experimental determinations of various critical-load combinations for the uniform strut. Diagrams. 9 ref. (Q21)

716-Q. Lateral Buckling of Beams of Rectangular Cross-Section Under Bending and Shear. M. G. Salvadori. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 403-405.

Results of investigation. (Q2, Q5)

717-Q. Lateral Buckling of Eccentrically Loaded I- and H-Section Columns. H. N. Hill and J. W. Clark. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 407-413.

Experimental investigation of failure by lateral buckling involving twisting of the member and bending in the direction perpendicular to the plane of the applied bending moment. Graphs, tables. (Q28, Q1, Q5)

718-Q. The Effect of Residual Stresses on Column Strength. William R. Osgood. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 415-418.

General expression for the buckling load of a column containing residual stresses assumed to be the same at every cross section and so distributed over the cross section that the Engesser-Shanley theory may be applied. (Q28, Q25)

719-Q. The Maximum Load Supported by an Elastic Column in a Rapid Compression Test. N. J. Hoff, S. V. Nardo, and Burton Erickson. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 419-423.

Values of the maximum load are calculated and presented in a diagram for a wide range of the dynamic similarity number and of the initial deviation of the column from perfect straightness. Graphs. (Q28)

720-Q. The Behavior of a Simply Supported Column Under Constant or Varying End Load With Transverse Displacement of One Point of Support. V. L. Salerno, Frances Bauer, and James Sheng. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 425-434.

Response of a simply supported column is calculated when one end of the column undergoes a prescribed lateral displacement in the form of a pulse. Time-displacement curves of the motion are obtained. 9 ref. (Q28)

721-Q. Numerical Analysis of the Process of Buckling of Elastic and Inelastic Columns. J. P. Chawla. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 435-441.

Numerical method of step-by-step integration of the dynamic equations for the transverse motion of an initially slightly curved column. Results are presented in a nondimensional form. Graphs. (Q28)

722-Q. The Effect of Prestressing on the Buckling Loads of Statically Redundant, Rigid-Jointed Trusses. E. F. Masur. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 443-448.

Shows that, for a rigid-jointed truss which is statically indeterminate with respect to its axial force distribution, the critical loads corresponding to neutral equilibrium generally can be increased through the introduction of suitable initial stresses. Equations governing the extreme values of the buckling loads are derived and applied to the case of a simply redundant truss. 8 ref. (Q28)

723-Q. Shortening of Column With Initial Curvature and Eccentricity and Its Influence on the Stress Distribution in Indeterminate Structures. Tung H. Lin. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 449-452.

Method of calculating the shortening of a pin-ended compressive member with initial curvature and eccentricities at different loads. (Q28)

724-Q. Creep in Metallic and Non-Metallic Materials. E. Orowan. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 453-472.

Survey of creep phenomena. Viscous, elastic and plastic creep and the calculation of stress and strain fields in bodies under creep conditions. Diagrams. 44 ref. (Q3, Pb)

725-Q. A Review of the Definitions of Finite Strain. A. V. Hershey. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 473-478.

Compares various published representations of strain with the conventional strain. Analysis is illustrated by an application to the practical case of a surface grid which is simultaneously stretched and sheared at variable rates. 38 ref. (Q25, Q27)

726-Q. The Principle of Minimum Work Applied to States of Finite, Homogeneous, Plane, Plastic Strain. A. Nadai. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 479-485.

Curves corresponding to minimum work sequences are extremal curves of the Euler differential equation of the problem of variational calculus for the minimum of plastic work done. Diagrams. (Q23)

727-Q. A More Fundamental Approach to Plastic Stress-Strain Relations. D. C. Drucker. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 487-491.

Loading surface or any of the customary yield curves for work-hardening or ideally plastic materials must be convex. Meaning of corners in such curves or vertices in the loading surfaces with special reference to problems of uniqueness. Diagrams. (Q23, Q27)

728-Q. On the Coincidence of Plasticity Solutions Obtained With Incremental and Deformation Theories. F. Edelman. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 493-498.

Investigation and results. 8 ref. (Q23)

729-Q. A Study in Photoplasticity. M. Hetenyi. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 499-502.

Experimental stress analysis on a material which, in addition to exhibiting appreciable birefringence under load, has a well-defined yield point and can undergo large deformations at nearly constant stress once the yield point is reached. The term photoplasticity is used to describe procedure. (Q25)

730-Q. Experimental Studies of Polyaxial Stress-Strain Laws of Plasticity. Bernard Budiansky, Norris F. Dow, Roger W. Peters, and Roland P. Shepherd. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 503-512.

Thin-walled cylinders of 14S-T4 Al alloy were stressed into the plastic range in axial compression and then twisted. Significance of the results with respect to stress-strain laws of plasticity. Graphs, tables. 21 ref. (Q23, Q27)

731-Q. Determination of Stress-Strain Curve in Shear by Twisting Square Plate. Walter Ramberg and James A. Miller. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 513-519.

Method which requires measurements of deflection or of extreme fiber bending strain in the center portion of a twisted square plate. 12 ref. (Q2)

732-Q. The Formation of a Necked Region and Fracture Along an Oblique Line in Flat Tensile Bars. Julius Aronofsky. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 521-532.

Investigation of the transition from the symmetrical-type neck to the oblique neck and oblique fracture. Method of characteristics of the hyperbolic partial differential equation is used to predict slip lines for the state of plane stress either uniaxial or biaxial. Photographs. 24 ref. (Q27)

733-Q. On Plastic-Rigid Solutions and Limit Design Theorems for Elastic-Plastic Bodies. D. C. Drucker, H. J. Greenberg, E. H. Lee, and W. Prager. Paper from "Proceedings of the First U. S. National Congress of

Mechanical Engineers." American Society of Mechanical Engineers, p. 533-538.

Limit load theorems, plastic-rigid type of analysis, and application of the limit load theorems to plastic-rigid solutions. Diagrams. 12 ref. (Q21, Q23)

734-Q. On the General Plane Problem of a Perfectly Plastic Body. Hilda Geiringer. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 539-545.

Three-dimensional and plane problems; characteristics; approximate solution of initial value problems; simple waves. 12 ref. (Q23)

735-Q. Limit Design of Plates. W. H. Pell and W. Prager. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 547-550.

Limit design of thin plates made of a perfectly plastic material which obeys the stress-strain law of Prandtl and Reuss. Method is given which furnishes bounds for the flow limit of such plates. 8 ref. (Q23)

736-Q. Approximate Methods in the Limit Design of Structures. J. Heyman and W. Nachbar. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 551-560.

Collapse of plane frames under concentrated loads is treated by approximate methods to obtain upper and lower bounds on the collapse factors. Techniques are extended to include cases of distributed loading. Diagrams, tables. 9 ref. (Q28)

737-Q. Plastic Flow in a Closed Ended Tube With Internal Pressure. R. Hill, E. H. Lee, S. J. Tupper. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 561-567.

Stress-strain relationship, theory of a thick closed tube under internal pressure, and finite difference solution for the plastic flow. Graphs. (Q23)

738-Q. Analysis of Rotating Disks of Arbitrary Contour and Radial Temperature Distribution in the Region of Plastic Deformation. S. S. Manson. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 569-577.

Method for determining displacements; stress and strain distributions in rotating disks of arbitrary contour; and radial temperature distributions subjected to either partial or total plasticity. Validity of the method is established by favorable comparison of theoretical results with experimental data. Graphs. 12 ref. (Q23)

739-Q. Unsymmetrical Bending of Rectangular Beams Beyond the Elastic Limit. M. S. Aghbabian and E. P. Popov. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 579-584.

Analysis of the behavior of rectangular beams subjected to unsymmetrical bending and stressed beyond the elastic limit. Experimental results with steel specimens verify the analytical work. (Q27, CN)

740-Q. A Theory for Combined Creep Strain-Stress Relations for Materials With Different Properties in Tension and Compression. Joseph Marin and Yoh-Han Pao. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 585-593.

Theory and results of experiments. Tables, graphs. (Q3, Q27)

741-Q. An Elementary Theory of Creep Buckling of Columns. D. Rosenthal and H. W. Baer. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 603-611.

Developed on the basis of a series of simplifying assumptions. Existence of a critical stress in creep buckling was demonstrated in a series of preliminary tests of short duration on 99.5% Al at 95° F. Graphs. 8 ref. (Q3, Al)

742-Q. Deflection of Members Subjected to Bending Accompanied by Creep. Joseph Marin and L. W. Hu. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 613-618.

Semi-graphical method for determining creep deflections in members subjected to pure bending. Experimental results are compared with the theoretical results using the graphical method developed. Graphs, tables. (Q3, Q5)

743-Q. Theory of Creep in Pin-Jointed Structures. Robert C. Meacham. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 619-624.

How a geometric method can be employed to examine a pin-jointed truss structure made of a visco-elastic-plastic material. (Q3)

744-Q. Experimental Study of Inelastic Buckling of Columns of Varying Section. R. E. Newton. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 625-629.

Undertaken for the purpose of providing the necessary experimental data for a satisfactory theory. Experimental study was restricted to centrally-loaded, hinged-end, straight columns of compact section. Three materials having different stress-strain characteristics in compression were employed and two different types of section variation were studied. Graphs. 17 ref. (Q28, Al, Mg, ST)

745-Q. Influence of the Bauschinger Effect on Inelastic Bending of Beams. Omar M. Sidebottom and Che-Tyan Chang. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 631-639.

Investigation to determine the influence of the Bauschinger effect on reducing the magnitude of residual stresses in an inelastically deformed beam as well as on lowering the load-carrying capacity of such a beam when the sense of the load is reversed. Diagrams. (Q25, Q5, CN)

746-Q. Use of a Recrystallization Method to Study the Nature of Damage in Fatigue of Metals. G. M. Sinclair and T. J. Dolan. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers." American Society of Mechanical Engineers, p. 647-651.

Study to evaluate relative extent to which disruption of atomic bonds occurs during early stages of a fatigue test. Periodical reheating to the recrystallization temperature was employed as a means of removing the effects of work hardening developed by the repeated stressing. Test results. Tables. (Q7, Cu)

747-Q. Fatigue Tests of Single Crystals of Ingot Iron. Frank A. Mc Clintock. Paper from "Proceedings of the First U. S. National Congress of Mechanical Engineers". American Society of Mechanical Engineers, p. 653-659.

Single crystals of ingot Fe were tested in a rotary bending fatigue machine and examined microscopically. Test results. Micrographs. 18 ref. (Q7, Fe)

748-Q. (English.) X-Ray Studies of Polycrystalline Metals Deformed by Rolling. I. The Examination of the Harder Metals, Copper, Nickel and Iron. P. Gay and A. Kelly. *Acta Crystallographica*, v. 6, pt. 2, Feb. 1953, p. 165-177.

Back-reflection with normal diameter and microbeam X-rays was used. Data were obtained on mode of deformation and nature of the cold worked state. Similarities were found for hard and soft metals. (Q24, M22, Cu, Ni, Fe, Sn, Zn, Pb Cd)

749-Q. (English.) Preyield Plastic and Anelastic Microstrain in Low-Carbon Steel. T. Vreeland, Jr., D. S. Wood, and D. S. Clark. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 414-421.

Results of an experimental investigation of an annealed low-carbon steel subjected to rapidly applied constant stresses less than the static upper yield stress. Sensitive measurements of plastic and anelastic microstrain were made. Relationship between stress and equilibrium microstrain was determined. Graphs. 13 ref. (Q23, Q22, CN)

750-Q. (English.) Notes on Work Hardening and Recovery. P. A. Beck. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 422-425.

Reviews literature and work. 34 ref. (Q23, N4)

751-Q. (English.) Deformation of Symmetric Zinc Bicrystals. J. J. Gilman. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 426-427.

Stress-strain data for a symmetric Zn bicrystal with a longitudinal boundary. Shows that the bicrystal deforms as if it were a monocrystal. Observations in terms of dislocation theory. (Q24, Zn)

752-Q. (English.) The Plasticity and Fracture of Irradiated AgCl Single Crystals. Yin-Yuan Li. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 455-456.

Changes produced in plastic and fracture properties of AgCl when irradiated with X-rays or ultraviolet light. (Q23, Q26)

753-Q. (English.) Shear Along Glide Planes in Aluminum. R. Maddin, E. H. Harrison, and R. W. Gelinas. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 460-464.

Experiments in which a cylindrical tricrystal of high-purity Al ½ × 6 in. was grown by the strain-anneal method. Surface preparation and shear values obtained. Graphs, micrographs. (Q2, Al)

754-Q. (English.) The Formation of Lattice Defects During Slip. H. G. van Bueren. *Acta Metallurgica*, v. 1, no. 4, July 1953, p. 464-465.

Experiments using deformed Al. (Q24, Al)

755-Q. (Czechoslovakian.) Investigation of Fatigue Phenomenon With X-Rays. Petr. Skulari. *Hutnické Listy*, v. 7, no. 9, 1952, p. 456-461.

Results show that a systematic study of interference ring changes may clarify transition from dangerous to safe loads. Photographs. 36 ref. (Q7, Al, Cu, Mg)

756-Q. (Czechoslovakian.) Wear of Railroad Materials. Frantisek Sicha. *Hutnické Listy*, v. 7, no. 9, 1952, p. 473-478.

Selection of materials for straight,

rolling and gliding parts. Photographs, graphs, tables. 26 ref. (Q9, T23, Mn, Si, CN)

757-Q. (French.) **Martensitic White Cast Iron Resistant to Wear by Abrasion.** *Fonderie,* May 1953, p. 3444-3445.

Chemical composition, preparation, and testing. (Q9, CI)

758-Q. (French.) **Wear and Fatigue on Rails.** M. Ros. *Revue de Métallurgie,* v. 50, no. 6, June 1953, p. 389-409.

Results of laboratory investigations and service tests carried out on rails made from a single steel and on heat treated compound rails. Graphs, photographs. (Q9, Q7, ST)

759-Q. (German.) **Plastic Buckling of a Centrally Compressed Steel Bar.** P. Csonka. *Acta Technica Academiae Scientiarum Hungaricae,* v. 5, no. 2, 1952, p. 153-161.

Problem of steel bars whose stress diagrams consist of a straight line and a sinusoidal arc. Graphs. 6 ref. (Q28)

760-Q. (German.) **The Strain Gage Metnod. I. Principles of the Strain Gage and Its Accessories.** Chr. Rohrbacn. *Archiv für technisches Messen,* no. 209, June 1953, p. 139-142.

Properties of strain-gage wires, bases, adhesives, and electrical leads, and conditions under which they should be used. Diagrams. 16 ref. (Q25)

761-Q. (German.) **Rheological Distribution Functions.** B. Gross. *Kolloid Zeitschrift,* v. 131, no. 3, June 1953, p. 161-168.

Creep and relaxation curves which describe viscoelastic processes are shown to be inadequately represented by the simple exponential equations of the elementary theory. Graphs, diagrams. 13 ref. (Q24)

762-Q. (German.) **Tests of Filler Rods for Acetylene Welding of Steel.** C. G. Keel. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 5, May 1953, p. 153-168.

Notch-impact strength, long-time alternating strength of weld metal, and alternating strength of welded butt joint. Safe stresses, confirmative tests, practical experience, gas content of weld metal, H_2 and its determination in weld metal, conclusions, and discussions. Photographs, graphs, diagrams. (Q6, Q23, K2, ST)

763-Q. (German.) **On Creep and Relaxation.** H. Umstätter. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 6, June 1953, p. 184-191.

Chemically related substances may have very different stress-strain diagrams while the stress-strain diagrams of chemically different substances may be quite similar. Graphs, diagrams. (Q3, Al, Cu, ST)

764-Q. (German.) **Behavior of Killed Low-Carbon Openhearth and Bessemer Steels During Hardness and Notch-Impact Testing.** Otto Hengstenberg and Walter Janiche. *Stahl und Eisen,* v. 73, no. 13, June 1953, p. 828-838.

Tests of properties in aged and unaged states. Graphs, tables. 68 ref. (Q29, Q6, ST)

765-Q. (German.) **The Effect of Stress Concentration on the Stability of Materials.** G. Sachs, W. F. Brown, Jr., and D. P. Newman. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 233-239.

Notch sensitivity seems to depend on time and temperautre for all materials. A definite ductility value cannot be given for smooth bars. Tables, graphs. 20 ref. (Q23)

766-Q. (German.) **Physical Processes During Alternate Stressing.** Ulrich Dehlinger. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 240-242.

Reason for disturbance is an athermal recovery process brought about by repeated slip within the crystals. Diagrams. 8 ref. (Q24)

767-Q. (German.) **A Uniform Hardness Test (Penetrating Hardness) With Cermet Specimens.** R. Mitsche. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 21-37; disc., p. 38.

Penetrators employed were either balls (Brinell), cones (Ludwik, Rockwell), or pyramids (Vickers). Materials ranged from Al to fully hardened steels. Graphs. 15 ref. (Q29, ST, Al)

768-Q. (German.) **Some New Points on the Strength of Alloys.** G. M. Schwab. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 49-63; disc., p. 63-64.

Temperature coefficient of the Brinell hardness of metals can be represented by a bi-exponential formula, leading to the assumption of two different processes with different activation energies. Brinell hardness of the phases α, β, γ, ε, η of the Hume-Rothery systems, Cu-Zn, Cu-Sn, Ag-Zn, and Ag-Cd, is measured between 20 and 450° C. in a special apparatus. Tables, graphs, diagrams. 22 ref. (Q29, Cu, Zn, Sn, Ag, Cd)

769-Q. (German.) **The Base for Friction of Solid Bodies.** R. Walzel. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 100-105; disc., p. 105.

Wear process is considered as being due to friction forces in excess of the tensile and shear strength of the surface layer. Correlates various factors involved. Special conditions determining the wear of sintered materials. Diagrams. (Q9)

770-Q. (German.) **A System for Cermet Standardization.** C. Ballhausen. Paper from "Plansee Proceedings 1952". Metallwerk Plansee G. m. b. H., p. 221-231; disc., p. 231.

Properties of hard metal alloys are plotted as space coordinates on a rectangular base having the volume ratio WC:TiC as abscissa and the Co content in area-percent as ordinate. Data on compressive strength, modulus of elasticity, hardness, modulus of rupture, coefficient of thermal expansion, and cutting characteristics are plotted for WC-TiC-Co-base hard metals. Diagrams, tables. (Q general, H11, W, Ti, C)

771-Q. (Italian.) **Stresses in Disks With an Elliptical Hole Which Are Subjected to External Pressure.** Giuseppe Manzella. *Tecnica Italiana,* v. 8, no. 2, Mar. 1953, p. 81-84.

Photo-elastic studies. Diagrams, graphs, photograph. 5 ref. (Q25)

772-Q. (Russian.) **Influence of Manganese on Mechanical Properties of Welded Seams and the Tendency Toward Hot Cracking.** E. D. Lonskii. *Avtogennoe Delo,* v. 23, no. 10, Oct. 1952, p. 5-7.

Explains above by increase of C content in built-up metal and not by increase of Mn content. Experiments. Tables, graphs. 1 ref. (Q general, K9, Mn)

773-Q. (Russian.) **Seizing of Metals With Simultaneous Plastic Deformation.** A. P. Semenov. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 1, Sept. 1, 1952, p. 125-128.

Local deformation caused by friction on surfaces of metals. Equipment. (Q9, Al, Pb, Cu, Cd, Sn, Ni, Zn)

774-Q. (Russian.) **Physical Nature of Fatigue.** L. A. Glikman and V. P. Tekst. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 699-701.

Mechanical and X-ray tests were made on stainless and carbon steel specimens at various stages of fatigue damage. Graphs. 3 ref. (Q7, CN, SS)

775-Q. (Russian.) **Most Advantageous Fiber Direction in Products From Anistropic Materials.** V. K. Grigorovich, N. D. Sobolev, and Ia. B. Fridmann. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 4, Oct. 1, 1952, p. 703-706.

Harder materials were found to have more anisotropy of mechanical properties than soft materials. Tests were made on alloy steel. Graphs, diagrams. 9 ref. (Q general, AY)

776-Q. (Russian.) **Electron-Microscopic Investigation of Slip Bands.** R. E. Garber and A. E. Kovalev. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 5, Oct. 11, 1952, p. 901-903.

Rock salt crystals were used to study the formation of slip bands. Micrographs. 9 ref. (Q24, M21)

777-Q. (Russian.) **Investigation of the Rule of Variation of the Intensity of X-Ray Interferences for Deformed Irons.** V. A. Ilina and V. K. Kritskaia. *Doklady Akademii Nauk, SSSR,* v. 87, new ser. no. 2, Nov. 11, 1952, p. 207-210.

Measured intensity of 19 X-ray reflections from deformed and nondeformed Fe in Mo K alpha-radiation. Tables, graphs. 10 ref. (Q24, Fe)

778-Q. (Russian.) **Abrasive Wear of Metals at Various Temperatures and Speeds.** G. I. Kiselev. *Doklady Akademii Nauk SSSR,* v. 87, new ser. no. 5, Dec. 11, 1952, p. 735-737.

Experiments on grinding of pure Cu and Zn and simple carbon steels with 0.20, 0.45, 0.60 and 1.2% C. Graphs. 7 ref. (Q9, G18, Cu, Zn, CN)

779-Q. (Russian.) **Measurement of Internal Pressure Arising in Polymorphic Metals During Heating.** E. N. Savitskii and V. F. Terekhova. *Doklady Akademii Nauk SSSR,* v. 87, new ser., no. 5, Dec. 11, 1952, p. 787-789.

Apparatus and methods for measuring internal stresses arising during phase transformations. Armco Fe and Mn were tested. Graphs. (Q25, N general, Fe, Mn)

780-Q. (Russian.) **Effect of Stress Frequency on Fatigue Strength of Steel During Service in Surface Active and Corrosive Media.** G. V. Karpenko. *Doklady Akademii Nauk SSSR,* v. 87, new ser., no. 5, Dec. 11, 1952, p. 797-800.

Experiments and results of fatigue tests using pure bending. Graphs. 6 ref. (Q7, R1, ST)

781-Q. (Russian.) **Physical Meaning of Stress Invariants Used in the Theory of Plasticity.** V. V. Novozhilov. *Prikladnaia Matematika i Mekhanika,* v. 16, no. 5, Sept.-Oct. 1952, p. 617-619.

Taking a sphere as elementary volume, author finds the invariant for the tangential stress, which permits an interpretation of yield criteria. 5 ref. (Q23)

782-Q. (Russian.) **Effect of the Temper Carbon in Mechanical Properties of Malleable Iron.** I. I. Kharoshev. *Sel'khozmashina,* no. 8, Aug. 1952, p. 28-30.

Tensile strength was reduced by 3 to 4.5 kg. per sq. mm. and the elongation increased by 2 to 6% depending on the annealing conditions. The pearlite case thickness showed a decisive effect on the properties. (Q23, CI)

783-Q. (Russian.) **Hardening of Cutting Tools by Cold Hardening With Shot.** N. A. Karasev. *Stanki i Instrument.* v. 23, no. 10, Oct. 1952, p. 27-29.

Metallographic examination of the hardened layers of high-speed and carbon toolsteels. Diagrams, graphs, photographs. (Q29, G23, TS)

784-Q. (Russian.) **Plasticity in Creep Conditions and a Mechanism of Precipitation Hardening.** V. I. Prosvirin.

Vestnik Mashinostroeniia, v. 33, no. 1, Jan. 1953, p. 42-47.

Theoretical discussion of plasticity and creep. (Q23, Q3, N7, AY)

785-Q. (Russian.) **Deformability of Magnesium Alloys.** S. I. Gubkin, M. I. Zatulovskii, L. N. Moguchii, S. S. Volkov, M. D. Desiatkov, A. P. Frolov, and N. T. Krasnov. *Vestnik Mashinostroeniia,* v. 33, no. 1, Jan. 1953, p. 47-53.

Forgability was studied. Results in curves and tables. Concludes that Mg alloy can replace Al alloys for parts not subject to heavy loads in service. 9 ref. (Q24, Mg, Al)

786-Q. Designing Cylinders and Struts for Maximum Strength. B. Saelman. *Machine Design,* v. 25, Aug. 1953, p. 133-138.

Cylinder tubes in hydraulic actuators designed for minimum weight have a definite practical limit of strength beyond which no advantage can be gained. General cases of tubes in bending and tubular columns. Diagrams. (Q23)

787-Q. A Method of Illumination for the Photography of Markings on Large Flat Areas of Sheet. A. Loro. *Metallurgia,* v. 48, no. 285, July, 1953, p. 48-50.

Method used to photograph stress-strain markings. Daigrams, photographs. (Q25)

788-Q. Some Problems on the Theory of Creep. Y. N. Rabotnov. *National Advisory Committee for Aeronautics,* Technical Memorandum 1353, Apr. 1953, 19 p.

Translated from *Vestnik Moskovskovo Universiteta,* no. 10, 1948, p. 81-91. A theory of creep is proposed which represents an extension of the theory of elastic heredity of Volterra to plastic deformation. Graphs. 3 ref. (Q3, Q24, Cr, Ni, Mo, ST)

789-Q. Combined-Stress Fatigue Strength of 76S-T61 Aluminum Alloy With Superimposed Mean Stresses and Corrections for Yielding. William N. Findley. *National Advisory Committee for Aeronautics,* Technical Note 2924, May 1953, 90 p.

Fatigue data for 76S-T61 Al for several combinations of bending and torsion with both alternating and mean stresses. Graphs, photographs, tables, diagrams. 66 ref. (Q7, Al)

790-Q. Strength Analysis of Stiffened Thick Beam Webs With Ratios of Web Depth to Web Thickness of Approximately 60. L. Ross Levin. *National Advisory Committee for Aeronautics,* Technical Note 2930, May 1953, 11 p.

Experimental investigation of the strength of plane diagonal-tension webs. Tables, diagrams, photograph. (Q23, Al)

791-Q. The Creep of Single Crystals of Aluminum. R. D. Johnson, F. R. Shober, and A. D. Schwope. *National Advisory Committee for Aeronautics,* Technical Note 2945, May 1953, 51 p.

An investigation of the creep in metals in the range from room temperature to 400° F. Graphs, photographs, diagrams, tables. 29 ref. (Q3, Al)

792-Q. Creep-Buckling Analysis of Rectangular-Section Columns. Charles Libove. *National Advisory Committee for Aeronautics,* Technical Note 2956, June 1953, 24 p.

Creep behavior of a slightly curved solid rectangular-section column. Diagrams, graphs. 6 ref. (Q3, Al)

793-Q. Structural Efficiencies of Various Aluminum, Titanium and Steel Alloys at Elevated Temperatures. George J. Heimerl and Philip J. Hughes. *National Advisory Committee for Aeronautics,* Technical Note 2975, July 1953, 16 p.

Efficient temperature ranges are indicated for two high-strength Al alloys, two Ti alloys, and three steels for some short-time compression-loading applications at elevated temperatures. Analysis covers strength under uniaxial compression, elastic stiffness, column buckling and buckling of long plates in compression or in shear. Graphs. (Q28, Al, Ti, ST)

794-Q. (English.) **The Brittle Fracture of Metals.** E. O. Hall. *Journal of the Mechanics and Physics of*

Investigation on single-crystal and polycrystal cleavage surfaces. Depth of plastic zone. Graphs, micrographs. 16 ref. (Q26)

795-Q. (English.) **The Yield Stress of Pure Lead in Compression.** N. Loizou and R. B. Sims. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 234-243.

Variation of yield stress of pure Pb in uniaxial compression with temperature, strain and strain rate. Experiments designed to test accuracy of the results. Graphs, photographs, tables. 5 ref. (Q23, Pb)

796-Q. (English.) **A New Method for Determining the Yield Criterion and Plastic Potential of Ductile Metals.** R. Hill. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 271-276.

Use of obliquely notched or grooved strips to obtain a long narrow zone of distortion. Diagrams, graph. 9 ref. (Q23)

797-Q. (English.) **Experiments With a Laboratory Extrusion Apparatus Under Conditions of Plane Strain.** N. W. Purchase and S. J. Tupper. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 277-283.

Experiments with a small-scale extrusion apparatus; results compared with theory of extrusion due to Hill (1948). Diagrams, graphs, table, photographs. 3 ref. (Q24, F24)

798-Q. (English.) **A Note on a Test of the Plastic Isotropy of Metals.** H. Ll. D. Pugh. *Journal of the Mechanics and Pnysics of Solids,* v. 1, July 1953, p. 284-286.

Evidence that a simple type of anisotropy will satisfy test conditions in work on plastic distortion of metals. (Q24)

799-Q. (English.) **Investigation of Stress Waves in Cylindrical Steel Bars by Means of Wire Strain Gauges.** S. Petersson. *Kungl. Tekniska Högskolans Handlingar (Transactions* of the Royal Institute of Technology, Stockholm, Sweden), no. 62, 1953, 21 p.

Propagation of stress waves was studied over the range of frequencies of practical importance. Photographs, diagrams, tables. 7 ref. (Q25, ST)

800-Q. (English.) **A Geometrical Discussion of the Slip Line Field in Plane Plastic Flow.** William Prager. *Kungl. Tekniska Högskolans Handlingar (Transactions* of the Royal Institute of Technology, Stockholm, Sweden), no. 65, 1953, 25 p.

Geometrical discussion including basic relations. Diagrams. 9 ref. (Q24)

801-Q. (German.) **A Theory of Creep in Single Crystals.** O. G. Folberth and A. Kochendörfer. *Journal of the Mechanics and Physics of Solids,* v. 1, July 1953, p. 244-257.

Extensions of creep laws to cover plastic behavior from creep to impact deformation. Graphs. 27 ref. (Q3, Q6)

802-Q. (French.) **Spherodized Cast Iron, Its Properties and Recent Progress.** G. Mohr. *Métallurgie et la Construction Mécanique,* v. 85, no. 5, May 1953, p. 375-377.

Mechanical properties are tabulated and compared with values of gray cast iron and cast steel. Photographs, diagrams, tables. (Q general, CI)

803-Q. (French.) **Internal Disorientations on Monocrystals of Al-3% Mg Solid Solution Deformed by Cold Rolling.** J. Herenguel, P. Leiong, and P. Lacombe. *Revue de Métallurgie,* v. 50, no. 3, Mar. 1953, p. 170-175; disc., p. 175-176.

Mechanism of the formation of deformation bands in favorable orientations. Photographs, diagrams. 7 ref. (Q24, Al)

804-Q. (French.) **Study of a Statistical Interpretation of Fatigue Tests.** R. Girschig. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 248-252.

Application of statistical methods to determine practical fatigue limits for various materials and specimens. Desirable experimental procedures. Graphs. (Q7)

805-Q. (French.) **Contribution to the Study of the Band Structure in Forged Steel. Combined Influence of Minor Segregation, Carbon Diffusion and Heat Treatment.** P. Cattier, Ch. Dubois, J. Bleton, and P. Bastien. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 275-290; disc., p. 290.

Distribution of inclusions depends on the more or less hardened structure of the band as the result of carbon diffusion. Photographs, graphs, tables. 6 ref. (Q24, J general, AY)

806-Q. (French.) **Contribution to the Statistical Study of Scatter in the Results of Rotating Bend Tests.** R. Cazaud. *Revue de Métallurgie,* v. 50, no. 4, Apr. 1953, p. 291-296.

Study of factors determining scatter in the results of fatigue tests. Tables, graphs, diagrams. 11 ref. (Q7)

807-Q. (French.) **New Methods of Analysis and Design of Constructions in the Plastic Range.** J. F. Baker and M. R. Horne. *Revue universelle des mines,* v. 9, ser. 9, no. 5, May 1953, p. 326-336.

Two methods for calculating metallic structures based on the plastic behavior of the steel. Charts. 10 ref. (Q23)

808-Q. (German.) **Bending and Buckling Stresses in Conformance to DIN 4114, Tentative Standard Specification —"Light Metals in Building Structure".** J. Weinhold. *Aluminium,* v. 29, no. 6, June 1953, p. 248-254.

Allowable stresses for designing one-piece struts of constant cross section. Safety standards are met. Graphs, diagrams, tables. 7 ref. (Q5, T26, EG-a)

809-Q. (German.) **The Shear Difference Method for the Complete Determination of Two-Dimensional Stress Distributions by Photo-Elasticity.** R. Albrecht. *Forschung auf dem Gebiete des Ingenieurwesens,* v. 19, Ausgabe B. no. 1, 1953, p. 17-23.

Fundamentals as applied to frame corners which are submitted either to pure bending or to bending with additional lateral forces. Diagrams, graphs, photographs, tables. (Q6, Q25)

810-Q. (German.) **Tests of Flow Properties by Simple Mechanical Models.** Ernst Mewes. *Kolloid-Zeitschrift,* v. 131, no. 2, May 1953, p. 84-88.

Demonstrates various forms of deformation behavior by means of models. Diagrams. 4 ref. (Q24)

811-Q. (German.) **Relationship Between Ludwig Hardness and Flow Curve, With Aid of Energy Balance.** R. Boklen. *Metall,* v. 7, nos. 11/12, June 1953, p. 436-441.

Derives equation for relationship, using only one empirical value. Equation is applied to specific cases. Graphs, photographs, tables. 24 ref. (Q29, Q24, Fe, ST, Al, Cu)

812-Q. (German.) **Hardness Testing of Cast Copper Alloys.** P. Melchior. *Metall,* v. 7, nos. 11/12, June 1953, p. 433-436.

Three sec. are wholly adequate for loading interval in Brinell hardness test. Tables, photographs, graphs. (Q29, Cu)

813-Q. (Hungarian.) **Wear Tests on Railway Brake Shoes Made of Gray Cast Iron. I.-III.** Endre Fule. *Ontöde*, v. 4, no. 1, Jan. 1953, p. 6-12; no. 2, Feb. 1953, p. 39-44; no. 3, Mar. 1953, p. 56-62.

Wear resistance tests with special consideration of relative wear values. Results evaluated statistically. The relative life of brake shoes is calculated. Tables, graphs. (Q9, CI)

814-Q. (Hungarian.) **Cast Iron Containing Copper.** Nandor Hajto and Ferenc Varga. *Ontöde*, v. 3, no. 6, June 1952, p. 121-129.

Experiments for the purpose of establishing the change in mechanical properties caused by additions of Cu. Results. Tables, graphs, photographs. 11 ref. (Q general, CI)

815-Q. (Italian.) **Considerations and Experimental Data Regarding a New Light Alloy for Bearing Materials on the Basis of Al-Sn-Ti.** N. Collari and L. Paglialunga. *Alluminio*, v. 22, no. 1, Jan. 1953, p. 22-27.

Mechanical properties. Diagrams, tables, graphs. 13 ref. (Q general, Al, SG-c)

816-Q. (Italian.) **Measuring the Velocity of Elastic Waves in Solids at Elevated Temperatures.** P. G. Bordoni and M. Nuovo. *Nuovo Cimento*, v. 10, ser. 9, no. 4, Apr. 1, 1953, p. 386-394.

Velocities were determined as functions of temperature for five pure metals. Tables, graphs. 10 ref. (Q21, Pb, Sn, Bi, Al, Cd)

817-Q. (Russian.) **Investigation of Local Plastic Deformation Under Active Tension.** I. A. Oding and V. S. Ivanova. *Izvestiia Akademii Nauk SSSR; Otdelenie Tekhnicheskikh Nauk*, no. 1, Jan. 1953, p. 96-105.

Distribution of plastic deformation along a tensile specimen was investigated by X-rays. Local deformation decreased with an increase of total deformation. Photographs, tables, graphs. 7 ref. (Q24, ST)

818-Q. Banded Structures In Steels. D. G. Walker. *Australasian Engineer*, May 7, 1953, p. 63-69.

Paper presented before The Australian Institute of Metals, Melbourne Branch, Physical Metallurgy Division, Oct. 9, 1952. Nature and origin of various types of banded segregation in steels. Attention is concentrated on "eutectoid banding". Its origin is discussed in terms of alloy, slag, and dynamic segregation. Micrographs. 45 ref. (Q24, ST)

819-Q. Creep-Resisting Magnesium Alloy. *Engineer*, v. 196, July 31, 1953, p. 143.

Composition and properties of Mg-Th-Zn alloy. Graphs. (Q3, Mg)

820-Q. Vibrating-Wire Strain Gauge for Use in Long-Term Tests on Structures. R. J. Mainstone. *Engineering*, v. 176, July 31, 1953, p. 153-156.

Design and operation of apparatus. Diagrams, photographs. 10 ref. (Q25)

821-Q. A Theory of Work-Hardening of Metals. II. Flow Without Slip-Lines, Recovery and Creep. N. F. Mott. *Philosophical Magazine*, v. 44, ser. 7, July 1953, p. 742-765.

"Fine slip", thermal recovery of cold-worked metals, and rate of diffusion in materials undergoing creep. Describes logarithmic, Andrade's β, and steady-state creep in terms of dislocation movement. (Q3, Q24)

822-Q. Tensile Testing at High and Low Temperatures. K. W. Mitchell. *Product Engineering*, v. 24, Aug. 1953, p. 197-203.

Describes tests and plots stress-strain curves. Graphs, tables, diagrams. 7 ref. (Q27, Fe, AY)

823-Q. A Simple Model for Demonstrating the Effect of Dislocations on the Strength of Crystals. P. Feltham and C. F. Goodeve. *Research*, v. 6, Aug. 1953, p. 46S-47S.

Simplified model using springs and magnets. Photograph. 8 ref. (Q23, M26)

824-Q. How Metals Wear. *SAE Journal*, v. 61, Aug. 1953, p. 23-25.

Excerpts from "Mechanism of Wear" by W. E. Jominy, presented at the SAE Annual Meeting, Detroit, Jan. 13, 1953. Types of wear and importance of lubrication. Diagrams. (Q9)

825-Q. Directionality in Rolled Copper and Brass. G. L. J. Bailey. *Sheet Metal Industries*, v. 30, Aug. 1953, p. 675-679.

Nature, causes and cures of directionality. Tables, diagrams, photograph. (Q24, Cu)

826-Q. Some Aluminum-Copper-Silicon Alloys. An Examination of Their Tensile Properties and Oxy-Acetylene Welding Characteristics. W. I. Pumphrey. *Welding Research*, v. 7, June 1953, p. 65-67.

Includes tables, graph. (Q23, K2, Al)

827-Q. (French.) **Measurements of Local Deformations and Calculation of Welding Stresses on Two Sides of the Floor Plates of Two Ships Under Construction.** R. Spronck and J. J. L. van Maanen. *Revue de la Soudure* (Brussels), v. 9, no. 2, 1953, p. 88-115.

Methods and test data. (Concluded.) (Q25, K general, ST)

828-Q. (German.) **Processes in Age Hardening.** A. Rühenbeck. *Aluminium*, v. 29, no. 6, June 1953, p. 254-255.

Observes Brinell-hardness variations of Al-Mg-Si alloy parts as cold deformed and after solution treating, quenching and tempering. Graphs. (Q29, J28, Al)

829-Q. (Pamphlet.) **A Comparative Investigation on the Fatigue Strength at Fluctuating Tension of Several Types of Riveted Lap Joints, a Series of Bolted and Some Series of Glued Lap Joints of 24S-T Alclad.** A. Hartman and G. C. Duyn. National Luchtvaartlaboratorium (Nat. Aero. Res. Inst.), Amsterdam, Report No. M 1857, 26 p.

Results of fatigue tests at fluctuating tension on various standard types of joints. Tables, graphs, photographs. 4 ref. (Q7, Al)

830-Q. (Book.) **Materials of Engineering.** Ed. 8. H. F. Moore and Mark B. Moore. 372 p. McGraw-Hill, 330 W. 42nd St., New York 36, N. Y. $6.00.

Includes recent information given by the electron microscope and a discussion of resistance to fatigue by metals under compressive loads. Metal data on B and Ti bring the section on metals up to date. A tabulation of physical properties of numerous plastics is included. (Q general)

831-Q. (Book.) **Proceedings of the First U. S. National Congress of Applied Mechanics.** 965 p. 1952. American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.

Consists of papers, abstracted separately, which were presented in Chicago, June 11-16, 1951. (Q general)

832-Q. (Book.) **Symposium on Fatigue With Emphasis on Statistical Approach. II.** 91 p. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. $2.00.

Includes "The Statistical Behavior of Fatigue Properties of SAE 4340 Steel Forgings", J. T. Ransom and R. F. Mehl; "The Statistical Behavior of Fatigue Properties and the Influence of Metallurgical Factors", E. Epremian and R. F. Mehl; "A New Interpretation of the Understressing Factor", E. Epremian and R. F. Mehl, and "Fatigue Properties of Larger Specimens With Related Size and Statistical Effects", O. J. Horger and H. R. Neifert. (Q7)

R

Corrosion

331-R. The Atmospheric Corrosion of Architectural Metals. Hugh P. Godard. *Engineering Journal*, v. 36, July 1953, p. 844-855.

Destruction of metals as related to the atmosphere. Tables, graphs, photographs. 42 ref. (R3, Al, Cu, Pb, Zn, CN, CI, AY)

332-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry*, v. 45, July 1953, p. 91A-92A, 94A.

Chart shows corrosion of "Durimet 20" and "Carpenter 20" in HNO_3 from 50 to 250° F. (R5, SS)

333-R. Growth of Sulphide Films on Copper. T. P. Hoar and A. J. P. Tucker. *Institute of Metals, Journal*, v. 81, Aug. 1953, p. 665-679.

Investigation of growth and structure of sulfide films on Cu. Films were produced under simple conditions in liquid media. Tables, diagrams, graphs. 42 ref. (R2, Cu)

334-R. The Oxidation of Copper in the Temperature Range 200°-800° C. R. F. Tylecote. *Institute of Metals, Journal*, v. 81, Aug. 1953, p. 681-700.

Changes in weight during oxidation of high-purity Cu sheet were measured over periods up to 100 hr. Effect of different oxidizing atmospheres, such as air, O_2, "oxygen-free" N_2, and air containing water vapor were determined. Other factors were effects of specimen shape, oxide film formed in air before high-temperature oxidation, and recrystallization on the growth of the oxide on work hardened Cu. Graphs, tables. 29 ref. (R2, Cu)

335-R. The Behaviour of Metallic Contacts at Low Voltages in Adverse Environments. Alan Fairweather. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 1, July 1953, p. 174-182.

Behavior of a closed contact subjected to corrosion and closure processes for a corroded contact, both with and without "wipe". Theoretical basis for design and testing techniques. Diagrams. (R general, P15, SG-r)

336-R. Microstructural Characteristics of Acid Corrosion in 18% Cr, 8-14% Ni, 3% Mo Steels. H. T. Shirley. *Iron and Steel Institute, Journal*, v. 174, July 1953, p. 242-249.

Experimental procedure and results. Tables, micrographs. 10 ref. (R6, SS)

337-R. The Corrosion of Mild Steel Moving Rapidly in Salt Solutions and Natural Waters. F. Wormwell, T. J. Nurse, and H. C. K. Ison. *Journal of Applied Chemistry*, v. 3, June 1953, p. 275-280.

In a high-speed (equivalent to 20 knots) rotor apparatus, electrode potentials can be determined. At 25° C. rate of corrosion is proportional to NaCl concentration up to 0.5*N*; sea water rate is below 0.5*N* NaCl. Graphs, 8 ref. (R4, CN)

338-R. Note on the Protection of Mild Steel by Films of Lanolin. E. G. Stroud and J. E. Rhoades-Brown. *Journal of Applied Chemistry*, v. 3, June 1953, p. 287-288.

Results show that a lanolin concentration of 12% or higher in either mineral oil or petroleum spirits is necessary for temporary protection. Lanolin is not completely soluble above 25%. (R10, L28, CN)

339-R. Linear Film Growth in Tarnishing Reactions. R. C. Williams and P. R. Wallace. *Journal of Chemical Physics,* v. 21, July 1953, p. 1294-1295.

The Cabrera-Mott theory satisfies results up to a film thickness of 80 Å. Modifications are required for a more general application. (R2, Ag)

340-R. Marine Exposure Tests on Ti-Al and Zr-Al Couples. *Light Metals,* v. 16, July 1953, p. 223.

Results of preliminary corrosion tests using alloyed Ti and Zr sheets. Photographs. (R3, R4, Ti, Zr, Al)

341-R. Antifreeze Is Never "Permanent". John B. Stobbart. *National Petroleum News,* v. 45, Aug. 5, 1953, p. 81-83.

Corrosion in water pumps due to incorrect use of "permanent" antifreeze. Photograph. (R7)

342-R. What to do About Amine Stress Corrosion. G. L. Garwood. *Oil and Gas Journal,* v. 52, July 27, 1953, p. 334-335, 337-340.

Stress-relieving after welding, and modifications of the gas treating process to reduce corrosive action. Photographs. (R7, J1, CN)

343-R. Ultrasonic Inspection for Internal Pipe-Line Corrosion. S. K. Gally. *Oil and Gas Journal,* v. 52, Aug. 1953, p. 61-62.

Corrosion problem, inspection procedure and pipe examination. (R11, S13)

344-R. A Development in Tank Heating Coils. *Petroleum,* v. 16, Aug. 1953, p. 223.

A cruciform cast iron pipe and joints which outlast previous piping in tanker heating coils because of its corrosion resistance. (R general)

345-R. (French.) **Protection of Metallic Constructions Against Atmospheric Corrosion.** D. Bermane. *Ossature Metallique,* v. 18, no. 6, June 1953, p. 333-340.

Various points and importance of sanding and acid treatment before application. Diagrams, graphs, tables, photographs. 10 ref. (R3, L26)

346-R. (German.) **The Effect of the Oxidizing Influence of Atmospheric Air on the Operation of Electrical Contacts.** R. Palme. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 19, no. 6, June 1953, p. 177-184.

Conductivity-reducing effect of oxide scales formed at different temperatures on a variety of metals and alloys. Tables, graphs, diagrams, photographs. 8 ref. (R2, Ag, Cu, Pt, Au, W, Mo)

347-R. (Russian.) **Application of Profilometer to the Study of Structural Corrosion.** O. G. Deriagina and G. V. Akimov. *Doklady Akademii Nauk SSSR,* v. 85, new ser. no. 6, Aug. 21, 1952, p. 1305-1308.

Changes of surfaces were investigated on Zn, Al, Fe, and their alloys. (R11, Zn, Al, Fe)

348-R. (Russian.) **Electrochemical Character of Metallic Corrosion in Hydrocarbon Solutions of Iodine.** L. G. Lindim. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 4, Oct. 1, 1952, p. 753-756.

Essential role of the electrochemical mechanism in corrosion processes. Schematic diagram, graphs. 9 ref. (R1, R6, Cu, Pb, Fe)

349-R. (Russian.) **Corrosion Inhibitors for Metals.** L. G. Gindin and I. N. Putilova. *Doklady Akademii Nauk SSSR,* v. 86, new ser., no. 5, Oct. 11, 1952, p. 973-975.

Mechanisms of passivation and corrosion inhibition in hydrocarbon solutions. Graphs. 5 ref. (R10)

350-R. (Russian.) **On the Mechanism of Metal Corrosion by Hydrocarbon Solutions of Sulfur.** L. G. Gindin and T. A. Miskinova. *Doklady Akademii Nauk SSSR,* v. 86, new ser. no. 6, Oct. 21, 1952, p. 1145-1146.

Possible explanation of the action of such compounds. 10 ref. (R6)

351-R. (Russian.) **Corrosion Properties of Alloying Elements of Stainless Steel in Oxidizing Solutions.** M. M. Kurtepov and G. V. Akimov. *Doklady Akademii Nauk SSSR,* v. 87, new ser., no. 5, Dec. 11, 1952, p. 795-796.

It was shown experimentally that Cr has low corrosion resistance in HNO_3-$K_2Cr_2O_7$ solutions, especially at high temperatures. (R5, Cr)

352-R. Rust Prevention by Pre-Treatment. *Chemical Age,* v. 69, July 1953, p. 175-176.

Process of pretreatment to prevent corrosion. Photograph. (R10)

353-R. Corrosion of Steel by Air-Free, Dilute, Weak Acids. Norman Hackerman and E. E. Glenn, Jr. *Electrochemical Society, Journal,* v. 100, Aug. 1953, p. 339-344.

Paper prepared for delivery before the Montreal Meeting of the Electrochemical Society, Oct. 26-30, 1952. Investigation of the kinetics of the reaction between steel and acetic acid without influence of a nonaqueous phase and under controlled conditions wherein only the concentration of the acidic constituents varied. Graphs. (R5, CN)

354-R. The Kinetics of the Initial Corrosion of Copper in Aqueous Solutions. George Richard Hill. *Electrochemical Society, Journal,* v. 100, Aug. 1953, p. 345-350.

Paper prepared for delivery before the Buffalo Meeting of the Electrochemical Society, Oct. 11-14, 1950. Experiments using an electroreduction cell coupled to a recording electronic voltmeter to determine thickness of very thin films of corrosion products on Cu surface. Data used to determine the rate laws and to evaluate the specific rate constant for the initial corrosion process. Tables, graphs. 20 ref. (R5, Cu)

355-R. Corrosion in Condensate Return System. J. L. Thornley. *Industry and Power,* v. 65, Aug. 1953, p. 58-60.

Influencing factors, effect of impurities, corrosion prevention and methods of feed treatments. Diagrams. (R4)

356-R. Disintegration Test for Welded Austenitic Chromium-Nickel Corrosion Resisting Steel. *Institute of Welding, Transactions,* v. 16, June 1953, p. 80-81.

An intercrystalline corrosion test. Diagrams. (R2, K9, SS)

357-R. The Galvanic Corrosion Theory for Adherence of Porcelain-Enamel Ground Coats to Steel. D. G. Moore, J. W. Pitts, J. C. Richmond, and W. N. Harrison. *National Advisory Committee for Aeronautics,* Technical Note 2935, June 1953, 19 p.

The galvanic theory of adhesion between ground coat enamels and steel. Diagrams, photographs, graphs. 11 ref. (R1, L27, ST)

358-R. Controlling Corrosion. *Oil and Gas Journal,* v. 52, Aug. 17, 1953, p. 155.

Control method in which a current is forced through pipe. Current may be furnished from ordinary power sources, a rectifier setup, or galvanic anodes. Diagrams. (R10)

359-R. Applications of Stainless Steel. W. L. Nelson. *Oil and Gas Journal,* v. 52, Aug. 17, 1953, p. 156.

Corrosive conditions which require use of stainless steels. (R general, T general, SS)

360-R. Casebook of a Corrosion Chemist. Maxey Brooke. *Petroleum Refiner,* v. 32, Aug. 1953, p. 131-132.

Five corrosion problems and how they were solved. Photographs. (R general, Cu, CN)

361-R. Appraisal of Alkaline Digester Corrosion Problems. H. O. Teeple. *Southern Pulp and Paper Manufacturer,* v. 16, Aug. 1953, p. 62-64, 66.

Paper presented before the joint fall meeting of the Southeastern and Southern Divisions of the American Pulp and Paper Mill Superintendents Assoc., Oct. 8-10, 1952, at Roanoke, Va. Survey conducted to determine extent and conditions affecting corrosion of digesters. (R5, CN, SS)

362-R. (French.) **Passivation of Aluminum Submerged in a Nitric Medium.** Jos. Patrie. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 87-95.

Reviews work on oxidation of Al in nitric bath. Influence of additional elements and nature of oxide film. Tables, graphs, photographs. (R10, Al)

363-R. (German.) **The Preservation of Light Metals.** G. Dallmeyer. *Aluminium,* v. 29, no. 5, May 1953, p. 189-194.

Preservatives used for light metal sheet, strip and tubes against corrosion damage in storage or service. Photographs. (R10, Al)

364-R. (German.) **The Behavior of Light Metal Alloys Exposed to Sea Water.** *Aluminium,* v. 29, no. 5, May 1953, p. 203-206.

Corrosive effect of sea atmosphere on light metals. Tables. 8 ref. (R3, Al, Mg)

365-R. (German.) **Materials for High Steam Temperatures.** Cl. Holzhauer. *Brennstoff-Wärme-Kraft,* v. 5, no. 7, July 1953, p. 234-236.

Development of new high-temperature steels. Computes life of the steel and determines the date on which a given part must be replaced. (R4, AY)

366-R. (German.) **Attack of Iron by Liquid Zinc.** R. Haarmann. *Metall,* v. 7, nos. 11/12, June 1953, p. 406-412.

Surface erosion of steel; eating of holes; attack of grain boundary; possibilities for future research, especially in hot galvanizing. Photographs, diagrams. 8 ref. (R6, L15, Fe, Zn, ST)

367-R. (Hungarian.) **Some New Points of View on the Application of Light Metals in the Construction of Equipment for the Chemical Industry, II.** Andras Domony. *Aluminium,* v. 5, no. 4, Apr. 1953, p. 88-91.

Corrosion resistance of various Al-Mg-Si alloys. Process of gluing light metal pieces. Tables. (R general, T29, Al)

368-R. (Hungarian.) **Defects on a Cast Iron Steam Turbine Shell.** Ferenc Boda and Zoltan Hegedüs. *Öntöde,* v. 4, no. 3, Mar. 1953, p. 69-70.

Corrosion proceeding along the graphite veins. Micrographs. (R2, CI)

369-R. (Russian.) **Corrosion of Steel by Kerosense and Methods of Combating It.** I. N. Putilova, L. G. Gindin, E. V. Artamonova, and V. A. Kazakova. *Zhurnal Prikladnoi Khimii,* v. 26, no. 2, Feb. 1953, p. 148-154.

Analytical data, initiating substances, stimulants and a number of organic compounds inhibiting the process. Tables. 20 ref. (R7, ST)

370-R. The Electrochemical Behaviour of Metals and Corrosion. M. Pourbaix. *Chemistry & Industry,* July 25, 1953, p. 780-786.

Describes above by use of experimental cells with steel, Cu, Pb, iron, and stainless steel. How applied potential controls corrosion. (R11, Cu, Pb, Fe, ST, SS)

371-R. Other Elements in Zinc Coatings. D. J. Swaine. *Chemistry & Industry,* July 25, 1953, p. 799-800.
Three samples of zinc coatings showed no marked changes in quality with traces of Pb, Sn, Fe, Cd, Cu, Al, Si, In, Mn and Ni.
(R11, Zn, Pb, Sn, Fe, Cd, Cu, Al, Si, In, Mn, Ni)

372-R. Cathodic Protection of Active Ships In Sea Water With Graphite Anodes. K. N. Barnard, G. L. Christie, and J. H. Greenblatt. *Corrosion (Technical Section),* v. 9, Aug. 1953, p. 246-250.
Trials on three steel tugs with impressed current cathodic protection systems. Graphs, photographs. (R10, ST)

373-R. Corrosion Resistance of High-Strength Low-Alloy Steels as Influenced by Composition and Environment. C. P. Larrabee. *Corrosion (Technical Section),* v. 9, Aug. 1953, p. 259-271.
Corrosion resistances of several high-strength low-alloy steels in various atmospheres, natural waters and soils are compared with those of structural Cu steel and C steel in same environments. Effects of variables that influence corrosion of these steels in the different media. Micrographs, graphs, tables. 41 ref. (R3, R4, R8, AY, CN)

374-R. Filiform Corrosion. M. Van Loo, D. D. Laiderman, and R. R. Bruhn. *Corrosion (Technical Section),* v. 9, Aug. 1953, p. 277-283.
Paper presented at Ninth Annual Conference, National Assoc. of Corrosion Engineers, Chicago, Ill., Mar. 16-20, 1953. Occurrence, factors involved, laboratory study and thermodynamic considerations. Diagrams, micrographs. 14 ref. (R1)

375-R. Accelerating Effect of Decreasing Temperature on Corrosion by Glycol Solutions. D. Caplan and M. Cohen. *Corrosion (Technical Section),* v. 9, Aug. 1953, p. 284-286.
Corrosion of galvanized steel in solutions of CH_2OHCH_2OH containing $Na_2B_4O_7$. Tables. (R7, CN, Zn)

376-R. Corrosion by Aqueous Solutions at Elevated Temperatures and Pressures. F. H. Beck and M. G. Fontana. *Corrosion (Technical Section),* v. 9, Aug. 1953, p. 287-293.
Paper presented at Ninth Annual Conference, National Assoc. of Corrosion Engineers, Chicago, Ill., Mar. 16-20, 1953. Data on corrosion by HNO_3, H_3PO_4, CH_3COOH, and NaOH at temperatures up to 425° F. Metals and alloys include CF-8, CF-8M, CN-7MCu, CB-30, cast Ti, and high-Si iron. Photographs, graphs, tables. (R5, Ti, AY, Cr, Ni)

377-R. Volatile Corrosion Inhibitor Insures Rust-Free Die Sets. David Myers. *Machinery (American),* v. 59, Aug. 1953, p. 195-197.
Use of a volatile powder to inhibit corrosion in transporting metal parts. Photographs. (R10)

378-R. Organic Inhibitor Controls Refinery Corrosion. C. C. Hulbert and J. A. Rippetoe. *Oil and Gas Journal,* v. 52, Aug. 17, 1953, p. 120-122, 124, 126-127.
Paper presented at A.P.I. Division of Refining meeting, New York, 1953. Successful experiment using an organic inhibitor which is thought to adhere to the metal in a semichemical fashion and to form a mechanical barrier between the metal and corrosive materials. Photographs, graphs. (R10)

379-R. Carbon Dioxide Corrosion Reduced. J. C. Albright. *Petroleum Engineer,* v. 25, Aug. 1953, p. C37-C38.
How heat and aeration reduce corrosion of steel and fittings due to a high saturation of the water with CO_2. (R10, ST, CI)

380-R. Operation and Maintenance of Rectifiers. J. C. Berringer. *Petroleum Engineer,* v. 25, Aug. 1953, p. D19-D20, D22.
Factors which enter into selection, installation and maintenance of rectifier units for cathodic protection. Photographs. (R10)

381-R. A Corrosion Study of Various Chromium Plated Electrodeposits. H. Brown and E. W. Hoover. *Plating,* v. 40, Aug. 1953, p. 874-878, 883-885; disc., p. 885-886.
Corrosion results in salt-spray, humidity and outdoor exposure tests for various coatings which are cathodic to steel. Diagrams, micrographs. 12 ref.
(R11, Ni, Cu, Cr, Au, Rh)

382-R. Analysis of Variability in Accelerated Corrosion Testing Cabinets. V. V. Kendall. *American Iron and Steel Institute,* New York, May 1953, 17 p.
A study of the reproducibility obtainable in spray or humidity test cabinets. Tables, diagram. (R11)

383-R. (French.) **Corrosion Test for Welded Austenitic or Chromium-Nickel Corrosion Resistant Steel.** *Soudure et Techniques Connexes,* v. 7, nos. 5-6, May-June 1953, suppl. p. 1-2.
Preparation of specimens and method of testing. Diagrams.
(R11, SS)

S
Inspection and Control

295-S. A Convenient Source of Gamma Radiation. Donald F. Saunders, Frederick F. Morehead, Jr., and Farrington Daniels. *American Chemical Society, Journal,* v. 75, July 5, 1953, p. 3096-3098.
Sealed assembly of two concentric Al tubes filled in between with Co powder and then irradiated in a pile to Co^{60}. (S19, Al, Co)

296-S. Examination of Flaws in Galvanized Domestic Hot Water Tanks. D. Caplan and P. J. Sereda. *Canadian Journal of Technology,* v. 31, July-Aug. 1953, p. 172-174.
Tests. Photographs. 3 ref.
(S13, L16, Zn, CN)

297-S. A High-Temperature High-Vacuum Furnace for Experimental Work. H. D. Blakelock and C. F. Machin. *Engineer,* v. 196, July 17, 1953, p. 83-84.
Construction and performance of furnace. Diagram, photographs. 12 ref. (S16)

298-S. Designing an Accurate Immersion Thermocouple. R. E. Bish. *Foundry,* v. 81, Aug. 1953, p. 193, 244.
Thermocouple designed for checking metal temperature in small electric furnaces used in investment casting. (S16, E15)

299-S. Wide Range Metering of Oxygen in Steel Plants. Marshall S. Gare. *Iron and Steel Engineer,* v. 30, July 1953, p. 74-81; disc., p. 81-82.
Meter which provides accuracy at very low as well as at high flows. Diagrams. (S18)

300-S. Tooling Material Standardization. Fred M. Burt. *Machine and Tool Blue Book,* v. 49, Aug. 1953, p. 162-166, 168.
Toolsteels and their mechanical properties. (S22, Q general, TS)

301-S. Techniques Used in Measuring Uniformity of Materials With Gamma Radiation. John N. Harris and Lawrence R. Megill. *Nondestructive Testing,* v. 11, July 1953, p. 9-13.
Principles, collimation, detectors, mechanical equipment and calibration. Photographs, diagrams. (S19)

302-S. Magnetic Inspection in Aircraft Manufacture. Howard Southworth. *Nondestructive Testing,* v. 11, July 1953, p. 23-26.
Types of defects and importance of detection in raw materials, finished products and service conditions. Photographs. (S13)

303-S. Interpretation of Radiographs of Aluminum and Magnesium Castings. J. J. Pierce. *Nondestructive Testing,* v. 11, July 1953, p. 27-31.
Gas holes, gas porosity, shrinkage cavity, shrinkage sponge, microshrinkage, foreign material, hot cracks and cold shuts. Photographs, micrographs. 12 ref. (S13, Al, Mg)

304-S. New X-Ray Gauge Checks Tin Plate Thickness. Frederick A. Behr. *Nondestructive Testing,* v. 11, July 1953, p. 33-36.
Testing apparatus. Photographs, diagrams. (S14, Sn, CN)

305-S. Ultrasonic Inspection. Equipment Features. D. C. Erdman. *Oil and Gas Journal,* v. 52, Aug. 1953, p. 62, 66.
Improvements in the echo-type ultrasonic gage. (S14)

306-S. Measuring Temperature With Paint. *Organic Finishing,* v. 14, July 1953, p. 22-23.
German development where a system of "Thermocolors" shows temperature changes within ±9° F. over a range of 104 to 1832° F. Several applications and limitations. Photographs. (S16)

307-S. New Ultrasonic Test Method. Thomas A. Dickinson. *Steel Processing,* v. 39, July 1953, p. 327-329.
Apparatus and mechanism. Photographs, diagrams. (S13)

308-S. Elements of Statistical Quality Control. W. W. Kauffman. *Tool Engineer,* v. 31, Aug. 1953, p. 59-63.
Importance of variations and limits. Graphs. (S12)

309-S. Inspection Techniques for Quality Welding. Lew Gilbert and William B. Bunn. *Welding Journal,* v. 32, July 1953, p. 614-619.
Nondestructive testing and inspection of welds. Photographs.
(S general, K9, CN)

310-S. (French.) **Extension of the International System of Measurements.** Eligio Perucca and Francesca Demichelis. *Helvetica Physica Acta,* v. 26, nos. 3-4, 1953, p. 329-348.
Contribution for unification of the measurement systems. 26 ref. (S22)

311-S. (German.) **Supersonic Testing by the Impulse-Echo Process and by Passing Sound Through a Sample.** Helmut Krainer and Ekkehart Krainer. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 5-6, May-June 1953, p. 229-236.
Test uses of supersonic apparatus. Determines relation of grain size to transmission of sound. Photographs, graphs, tables. 23 ref. (S13)

312-S. (German.) **Thermo-Electric Temperature-Measuring Arrangement for High-Precision Demands, Especially for Thermal Analysis.** Walter Hunsinger. *Zeitschrift für Metallkunde,* v. 44, no. 6, June 1953, p. 261-264.
Measuring arrangement whereby very exact measurements of temperatures at terminal points and abrupt breaks in T-T curves are possible. Diagrams. (S16)

313-S. (Norwegian.) **Sound Transmission Tests on Welded Seams.** G. Fagerholt. *Teknisk Ukeblad,* v. 100, no. 19, May 7, 1953, p. 394-397.
Theory and methods of detecting flaws in welded seams with ultrasounds. Diagrams, graphs, photographs. (S13)

314-S. Measurement of the Bearing Length of Drawing Dies. *Industrial Diamond Review,* v. 13, July 1953, p. 158-162.

Development of instruments to measure bearing length. Diagrams. (S14)

315-S. Ultrasonic Testing Improved With Use of Liquid Coupling. J. B. Morgan. *Iron Age,* v. 172, Aug. 6, 1953, p. 131-135.

Use and advantages of liquid searching unit combining advantages of contact and immersion methods. Photographs, diagrams. (S13)

316-S. Russian Steels Today. Carl A. Zapffe. *Materials & Methods,* v. 38, Aug. 1953, p. 79-86.

Detailed picture of steels currently being used in Russia. Classification, compositions and applications of commonly used grades. Tables. (S22, T general, ST)

317-S. Photographic Inspection Spots Defective Brazing. M. A. Slairetam. *Materials & Methods,* v. 38, Aug. 1953, p. 94-95.

Advantages of inspection technique; procedure. Photographs. (S13, K8)

318-S. (French.) How to Avoid Mixtures of Steel. P. Devilder. *Métallurgie et la Construction Mécanique,* v. 85, no. 2, Feb. 1953, p. 95-99.

Methods of identifying various grades of steel products. Diagrams. (S10, ST)

319-S. (French.) Experimental Comparison of Different Techniques for Detecting Fissures by Liquid Penetrants. H. de Leiris. *Revue de Metallurgie,* v. 50, no. 3, Mar. 1953, p. 159-168; disc., p. 169.

Various solvents and coloring agents, typical applications. (S13)

320-S. (French.) Identification and Analysis of Inclusions in Steel. Jean Massinon. *Revue de Metallurgie,* v. 50, no. 4, Apr. 1953, p. 264-274; disc., p. 274.

I_2 solution method was compared with electrolytic analysis. Reliability and applications. Photographs, tables. (S13, ST)

321-S. (German.) Length and Angle-Measuring Instruments. M. Dühmke. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 615-618.

Mechanical, optical, electrical and electronic measuring instruments. Photographs. 12 ref. (S14)

322-S. (German.) Measuring and Regulating Instruments for Flow Technology. W. Weber. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 619-620.

Flow, pressure measuring and recording devices. Photographs. (S18)

323-S. (German.) Regulation Techniques. W. Hunsinger. *VDI, Zeitschrift des Vereines deutscher Ingenieure,* v. 95, no. 19, July 1, 1953, p. 627-632.

Variety of regulators and controls for industrial applications. Photographs. 110 ref. (S general)

324-S. Gage Control That Cuts Rejects to 2%. Ralph Hixenbaug. *Factory Management and Maintenance,* v. 3, Aug. 1953, p. 112-115.

Gage laboratory, inventory and inspection program. Diagrams, photographs. (S14)

325-S. Control of Metallurgical Standards. W. J. Harris, Jr. *Industrial Heating,* v. 20, Aug. 1953, p. 1500, 1502, 1504, 1506, 1508, 1510.

Condensed from paper delivered before American Standards Assoc. in New York, N. Y. Emphasizes necessity of integrating government research findings with the standards and specifications of the traditional consumer-producer team. (S22)

326-S. SAE Standard Double-Wall Steel Tubing. *Machinery, (American),* v. 59, Aug. 1953, p. 255.

Data sheet. (S22)

327-S. A Precise Angular Standard. *National Bureau of Standards Technical News Bulletin,* v. 37, Aug. 1953, p. 118-119.

Polygon to calibrate angle gage blocks. Photographs. (S22)

328-S. A Rational System of Limits. F. W. M. Lee. *Tool Engineer,* v. 31, Aug. 1953, p. 54-58.

System taking into account modern size tolerance requirements and allowing for flexibility. Tables. (S14)

329-S. Ultrasonic Testing of a Large Engine Crankshaft. W. A. Black. *American Iron and Steel Institute,* New York, May 1953, 17 p.

Effectiveness of the ultrasonic tester in ferreting out flaws in large productioni tems. Diagrams, photographs. (S13, ST)

T
Applications of Metals in Equipment

234-T. Postwar Developments in Aluminum Foil Packaging. Gene Bremer. *American Paper Converter,* v. 27, Aug. 1953, p. 18-20.

Extended use and production. (T10, Al)

235-T. How to Select Your Materials. H. W. van der Hoeven. *Chemical Engineering,* v. 60, Aug. 1953, p. 202-208.

Guide to the proper selection of materials for chemical processing equipment. Properties of various metals used in the chemical industry. Photographs, tables. (T29, Ni, Ag, ST)

236-T. Aluminum Comes of Age in a Nuclear World. N. F. Ritchey. *Iron Age,* v. 172, July 30, 1953, p. 94-97.

Use of Al in conjunction with U for atomic energy applications. (T25, Al, U)

237-T. Light Alloy Ladder for Fire-Fighting. *Light Metals,* v. 16, July 1953, p. 227.

Described and illustrated. (T10, Al)

238-T. New Flour Milling Plant in Light Alloy. *Light Metals,* v. 16, July 1953, p. 228-229.

Use of Al in the equipment. Photographs. (T29, Al)

239-T. Spring Design. XX. W. R. Berry. *Mechanical World and Engineering Record,* v. 133, July 1953, p. 316-319.

Detailed examination of factors involved in the design of cantilever and laminated springs. (T7, ST)

240-T. Doing More With Less Nickel. Ernest A. Schoefer. *Steel,* v. 133, Aug. 3, 1953, p. 134-135.

Research on use of Ni alloys. Graphs, table, photograph. (T general, Ni, Cr)

241-T. Better Bridges By-Pass Tougher Traffic Tangles. *Welding Journal,* v. 32, July 1953, p. 627-630.

Uses of various alloy steels in bridge construction. Photographs. (T26, AY)

242-T. (English.) Light Metal Wheel Centers of Tramcars and Low Temperature Investigations Connected With Them. I. Baranszky-Job. *Acta Technica Academiae Scientiarum Hungaricae,* v. 5, no. 2, 1952, p. 183-205.

Production of Al railway wheel centers. Tables, graphs. 20 ref. (T23, Al)

243-T. (French.) Aluminum Roofs Selected for Swiss Freight Cars. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 138-140.

Use of Al alloys in roofs. Photographs, diagrams. (T23, Al)

244-T. Use of Aluminum in New Building Construction of Cegedur. Andre Chevrier. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 155-159.

Use of Al for large sash windows, partitions, heating and lighting fixtures, roofing, and interior decorations. Photographs. (T26, Al)

245-T. (French.) Electronic Dust Remover "Precipitron S-W". Maurice Victor. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 161-163.

Electromagnetic dust filters made of Al. Photographs. (T27, Al)

246-T. (French.) Hangar of the "Comet". Maurice Victor. *Revue de l'Aluminium,* v. 30, no. 198, Apr. 1953, p. 164-167.

Use of Al in the construction of a large aviation hangar. Photographs, table. (T26, Al)

247-T. (French.) Evaluating the Quality of Zirconium Powder Used in the Production of Vacuum Tubes. H. Figour and H. Bonnel. *Vide,* v. 8, no. 44, Mar. 1953, p. 1305-1306.

Quality of Zr used as a getter in electron tubes. Diagram, table. (T1, H11, Zr)

248-T. (German.) Steel Wires for Reinforced Concrete. Fritz Schwier. *Stahl und Eisen,* v. 73, no. 14, July 2, 1953, p. 924-925.

Abstract of an article in *Beton u. Stahlbeton,* v. 47 (1952), p. 201-207, on the use of high-strength steel wires in modern reinforced concrete construction. (T26, ST)

249-T. (Russian.) Enlarge the Use of New Brands of Steel. M. Pridantsev. *Za Ekonomiiu Materialov,* no. 3, Oct. 1952, p. 36-43.

Substitutes for various highly alloyed steels. (T general, AY)

250-T. Efficient Structures in Aluminium. M. Bridgewater. *Metallurgia,* v. 48, no. 285, July 1953, p. 11-17.

Significant differences between Al and steel as structural media; latest views on the design of light alloy members. Graphs, photographs, diagrams. (T26, Al, Cn)

251-T. More Carbon for the Steelmaker. J. S. Copley and E. F. Sipp, Jr. *Steel,* v. 133, Aug. 10, 1953, p. 105, 108.

Applications of C other than as ingredient in steel. Photographs. (T general, C)

252-T. (French.) Use of Zinc Alloys for the Manufacture of Pressing Tools. R. Lébre. *Métallurgie et la Construction Mécanique,* v. 85, no. 4, Apr. 1953, p. 283, 285, 287, 289.

Brief outline of the possibilities of Zn-base alloys for manufacturing punches, dies, and molds intended for cutting and stamping of sheets. Photographs, tables. (T5, Zn)

253-T. (French.) Davey Paxman 12 YHA Diesel of the British Navy. Leonce Keuleyan. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 108-109.

Davy Paxman 12 YHA model develops 800 hp. at 1250 rpm. It is built almost entirely of light alloy. Photographs, diagrams. (T22, EG-a)

254-T. (French.) Exploration of the Submarine World. Jacques-Yves Cousteau. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 115-123.

Use of light alloys in equipment for underwater mobility. Diagrams, photographs. (T22, Al)

255-T. (French.) Working Pressure of Aluminum and Light Alloy Tubes. Maurice Besnard and Rene Calais. *Revue de l'Aluminium,* v. 30, no. 197, Mar. 1953, p. 124-125.

Table which makes it possible to define the conditions of use of Al and light alloy tubes. Table. (T general, Al)

256-T. (French.) Magnesium Hoisting Installations. Pierre Le Bihan. *Revue*

de l'Aluminium, v. 30, no. 199, May 1953, p. 205-208.

Use of Mg in the field of lifting equipment. Photographs, diagrams. (T5, Mg)

257-T. (French.) **High-Quality Steels Intended for Welded Metallic Construction.** H. Herbiet. *Revue universelle des mines*, v. 9, ser. 9, no. 5, May 1953, p. 368-374.

Factors affecting weldability and strength of welded structures. 4 ref. (T26, K9, ST)

258-T. (German.) **Aluminum as Material for New Light-Metal Articulated Trains.** W. Bleicher and A. Szymanski. *Aluminium*, v. 29, no. 6, June 1953, p. 245-247.

Use of Al-Mg-Si, Al-Mg, and Al-Mg-Mn alloys in railway coaches. Tables, diagrams. (T23, Al)

259-T. (German.) **Electrical Measurements With Gold-Chromium Standard Resistance.** Alfred Schulze. *Umschau in Wissenschaft und Technik*, v. 53, no. 12, June 15, 1953, p. 358-359.

Difficulties and achievements in developing high-precision Au-Cr resistances. Photographs. (T1, Cr, Au)

260-T. (German.) **Magnetic-Powder Couplings Protect Motors.** W. Lanze. *Umschau in Wissenschaft und Technik*, v. 53, no. 12, June 15, 1953, p. 361-363.

New clutches. Photographs, diagrams. 4 ref. (T21, H general)

261-T. (German.) **Construction of Industrial Furnaces.** Walter Stuhlmann. *VDI, Zeitschrift des Vereines deutscher Ingenieure*, v. 95, no. 19, July 1, 1953, p. 586-589.

Modern melting, heat treating and drying furnaces and their accessories based on the latest principles of heating efficiency. Diagram, photographs. 54 ref. (T5, E10, J general)

262-T. (Italian.) **Aluminum in the Production of Packaging Materials in Italy.** E. Hugony. *Alluminio*, v. 22, no. 1, Jan. 1953, p. 9-21.

Properties and uses of Al and its alloys as a packaging material. Tables, photographs. 8 ref. (T10, Ti, Pb)

263-T. Russian.) **Economical Ratio of Aluminum and Steel Sections in Aluminum-Steel Conductors.** A. A. Glazunov and G. M. Rozanov. *Elektrichestvo*, no. 5, May 1952, p. 10-15.

Suggests new construction with increased ratio of Al and steel sections. Corresponding change in the standards GOST 839-41. Tables. 5 ref. (T1, Al, ST)

264-T. Junction Diode Operates Well at High Temperatures. *Chemical and Engineering News*, v. 31, Aug. 10, 1953, p. 3284, 3286.

Diode of high-purity Si alloy. Does not replace Ge diodes. (T1, Si)

265-T. Steam Piping and Valves for 1100° F. Service. Frank A. Ritchings and Sabin Crocker. *Heating, Piping & Air Conditioning*, v. 25, Aug. 1953, p. 84-88.

Paper presented at the 1953 semi-annual meeting of the American Society of Mechanical Engineers, Los Angeles. Design of piping for large steamturbine boiler units. (To be continued.) (T25)

266-T. Petroleum Industry Finds Many Uses for Aluminum. Floyd A. Lewis. *Petroleum Engineer*, v. 25, Aug. 1953, p. A47-A48, A50, A52.

Applications. (T general, Al)

267-T. Oxidizing Catalyst at Peak Performance. Eugene B. Brien. *Petroleum Engineer*, v. 25, Aug. 1953, p. C15-C16.

Use of Pt alloy. Photographs. (T29, Pt)

268-T. (German.) **Aluminum and the German Transport Exposition, Munich, 1953.** H. Kessler. *Aluminium*, v. 29, no. 6, June 1953, p. 241-244.

Several applications of Al to transport problems, e.g., frames, shipstacks, wheel rims, wheel disks and cylinder heads. Photographs. (T22, T23, Al)

V

Materials

General Coverage of Specific Materials

95-V. Experts Learn to Live With Titanium. Irving Stone. *Aviation Week*, v. 59, Aug. 3, 1953, p. 30, 32-33, 36-37.

Use of Ti in jet engines; briefly describes alloys, forging, sheet fabrication, welding, machinability and heat treatment. Photographs, diagrams. (T25, Ti, Al)

96-V. Titanium. Its Physical Metallurgy and Potentialities. H. V. Kinsey. *Canadian Mining and Metallurgical Bulletin*, v. 46, July 1953, p. 411-420; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 56, 1953, p. 191-200.

Physical properties, sources, extraction, melting, power requirements, powder metallurgy, hot-working, commercial alloys and applications. Tables, graphs, micrographs. 45 ref. (Ti)

97-V. 17% Chromium Stainless Steels. *Chemical Engineering*, v. 60, Aug. 1953, p. 260, 262, 264, 266, 268.

Corrosion resistance, applications and physical and mechanical properties. Tables. (R general, P general, Q general, SS)

98-V. Production, Analysis, and Applications of the Lanthanons. R. C. Vickery. *Industrial Chemist*, v. 29, July 1953, p. 291-294.

Recent developments in general chemistry of rare earths. 35 ref. (EG-g)

99-V. The Manufacture and Properties of Titanium and Its Alloys. N. P Allen. *Metal Treatment and Drop Forging*, v. 20, June 1953, p. 245-252; July 1953, p. 327-334.

Early production; purity of commercial Ti; crystalline and general working properties; and common alloying elements. Production processes which control availability for commercial use. Graphs, micrographs, diagrams. 24 ref. (Ti)

100-V. Rare Earths Series. Their Atomic Structure, History and Uses. M. C. Irani. *Mines Magazine*, v. 43, Apr. 1953, p. 29-34.

Atomic structure, history, and occurrence of rare earth metals. Preparation and uses of alloys and compounds. (EG-g)

101-V. Titanium. W. H. Dennis. *Mining Magazine*, v. 89, July 1953, p. 19-26.

Uses and present metallurgical position. Diagrams, table, photograph. (T general, Ti)

102-V. Germanium Is in Demand. J. L. P. Wyndham. *South African Mining and Engineering Journal*, v. 64, June 27, 1953, p. 687, 689, 691.

History, metallurgy, extraction and properties. Tables. 7 ref. (Ge)

103-V. Middleweight Champ Comes of Age. *Western Machinery and Steel World*, v. 44, July 1953, p. 102-103.

Developments which have extended use of Ti. Micrographs, photographs. (Ti)

104-V. Strategic Beryllium From Domestic Pegmatites. B. H. Clemmons and James S. Browning. *Mining Engineering*, v. 5, Aug. 1953, p. 786-788.

Occurrence, production, consumption, uses, processing and recovery of Be. Table, map. (B10, C general, T general, Be)

105-V. (French.) **Specification for Production of A-U5 GT.** *Fonderie*, no. 89, June 1953, p. 3488-3491.

Chemical composition, mechanical characteristics, heat treatment, and casting characteristics of an Al-Cu alloy used for decorative applications. (S 22, Q general, J general, E general, Al, Cu)

106-V. (Hungarian.) **Metallurgical Problems of High-Quality Mild Steels.** Istvan Balsay. *Kohaszati Lapok*, v. 7, no. 11, Nov. 1952, p. 249-263.

Comprehensive review. Realm of application of these steels, qualitative requirements, and metallurgical prerequisites for these requirements. 19 ref. (T general, ST)

107-V. (Book.) **Symposium on Aluminum Alloy Castings.** 224 p. 1953. The Aluminium Development Association, 33 Grosvenor St., London W.1, England. 4s.

Presents papers on welding, finishing, and uses of Al alloy castings. (K general, L general, T general, Al)

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PHYSICAL METALLURGISTS: Recent graduates with B.S. and advanced degrees desired for expanding research program on copper, titanium and other metals. An opportunity for a permanent position with a progressive and successful company in southern New England. Please give details of education, experience and interests. Box 10-5.

METALLURGIST: With aptitude for research and development in the field of high alloy steels. Prefer man with laboratory experience, possessing sound background in physical metallurgy, capable of writing clear, concise reports. Opportunities for professional development through publications and association with recognized authorities. In reply, indicate training, experience, military status and salary requirements. Box 10-10.

DESIGNERS, WELDING ENGINEER: Require two designers having broad experience with industrial machinery applying design development to automatic welding techniques. Welding engineer must have several years practical experience in gas and electric arc, submerged and gas shielded arc welding, plus weld jig design. Large company, excellent opportunity, positions permanent. Box 10-15.

PHYSICAL METALLURGIST: Research department of the New Jersey Zinc Co. requires a physical metallurgist interested in research and development work on nonferrous alloys. Prefer man with advanced academic training or up to 10 years experience in theoretical and practical physical metallurgy. Clean, attractive community. Give full details, references and expected salary in first letter. Write: Research Dept., New Jersey Zinc Co., Palmerton, Pa.

METALLURGICAL ENGINEER: With at least five years experience in nonferrous field. Must have thorough working knowledge of wrought and cast aluminum and magnesium-base alloys and related processes of casting, heat treating, fabrication, etc., and familiarity with other nonferrous alloys. Must be able to act as consultant to product and design engineers, solve production problems, set standards and specifications. Box 10-20.

Midwest

METALLURGIST: Position in research department of nonferrous metal fabricating concern. Age under 35 preferred. Some experience in, or knowledge of, copper and aluminum alloys desirable but not essential. Work involves laboratory investigations in physical metallurgy, trouble shooting, testing. Report writing ability essential. New York State. Box 10-25.

METALLURGIST or CHEMICAL ENGINEER: Recent graduate trained in metallography and analytical chemistry interested in doing research and development work on wire and wire products. Good opportunity for advancement in long-established progressive company of medium size in eastern Indiana. In reply, provide usual details including draft status and salary desired. Box 10-30.

METALLURGIST: For projects involving stress and strain measurement, experience in research techniques using strain gages, brittle lacquers, etc., is desirable. Work is primarily on pressure vessels, heat exchange equipment and study of materials for such service. Knowledge of theoretical stress-strain relationships desirable. Well-equipped laboratory located in Ohio. Send complete details of education and experience to Box 10-130.

South

RESEARCH ASSISTANT: B.S. degree in science or engineering, for southeastern academic x-ray diffraction laboratory eleven months annually. Duties include publishable fundamental research on metals; initiation of similar studies encouraged. Reply should include complete personal data and statement of professional interests. Box 10-35.

Government

METALLURGIST: Naval Air Center has vacancies at grade GS-5 to GS-12 level with salary ranging from $3410 to $7040 per annum. Positions involve research, development and evaluation work on boron-treated steels, titanium alloys, heat resisting alloys, oxidation resistant coatings for molybdenum, inert and shielded metal arc and resistance welding, corrosion and electroplating. Interested persons should file Application for Federal Employment, Standard Form 57, with the Industrial Relations Dept., Naval Air Material Center, U. S. Naval Base, Philadelphia 12, Pa. Applications may be obtained at above address, post offices or Civil Service Regional Office.

AERONAUTICAL ENGINEERS: For Air Force Cambridge Research Center and other Federal agencies in New England States. Positions in fields of detail design, stress analysis, preliminary and modification design. Salaries range from $4205 to $7040 per annum. Appropriate education or experience or a combination of education and experience required.

No written test. Applicants must be U. S. citizens. Applications must be on Form 57 or 58 and may be obtained from the Executive Secretary, Board of U. S. Civil Service Examiners, Air Force Cambridge Research Center, 230 Albany St., Cambridge 39, Mass., any Civil Service Regional Office or post offices. Submit forms to Cambridge, Mass.

POSITIONS WANTED

METALLURGIST: Senior, responsible, experience in industrial research, quality control. Record of basic contributions to manufacturing efficiency and performance of competitive products. Desires senior responsible job with aggressive, well established American enterprise. Box 10-40.

METALLURGICAL SALES ENGINEER: B.S. degree in metallurgical engineering. Age 35, married. Ten years industrial activity, including managerial experience, sales and service as mill representative, principally in stainless tubing, some nonferrous. Administrative ability, well-rounded background of selling combined with technical knowledge. Desires eastern location, same capacity or management trainee. Available for travel. Box 10-45.

TUBING ENGINEER: B.S. degree, age 42, married. Twenty years experience in metal forming, welding, brazing, tinning, mandrel, rod and floating plug drawing, sinking and annealing of steel tubing. Also selected lubricants and trouble shooting for above processes. Desires position as factory manager or assistant. Excellent references. Box 10-50.

METALLURGICAL ENGINEER: B.S. degree, age 34. Presently employed as sales engineer for heavy machinery builder. No experience in metallurgy except where it concerns selection of materials. Can offer successful sales career in specialized field as proof of desire to do good job. Denver or Kalamazoo areas desired. Box 10-55.

CONSULTANT: To serve on part-time basis. Ph.D. degree in metallurgy. Has 26 years experience in directing development and research work and managing production control laboratories. Work included steels, casting and rolling of nickel-silver, brass, sterling silver, white metals, form casting of magnesium and bronze, and electroplating of most metals that can be plated. Box 10-60.

METALLURGICAL ENGINEER: Fifteen years diversified industrial experience in production, research and supervision in metal processing field. Familiar with tool and alloy steels, gear metallurgy, heat treating, welding, material specifications, trouble shooting, and related metallurgical fields. Acquainted with aircraft, ordnance and missile work. Interested in position as staff and/or plant metallurgist. Box 10-65.

METALLURGIST: Fifteen years diversified industrial and research experience. Physical metallurgist with strong background in metallurgical engineering. Well versed in modern laboratory and fabrication practices. Past six years and presently employed in staff position demanding resourcefulness and adaptability. Supervisory experience. M.S. and Ph.D. degrees. Foreign languages. Married, age 39. Desires challenging position and professional advancement. References. Box 10-70.

FERROUS METALLURGIST: Registered, metallurgical engineering degree, age 35, married. Diversified experience in alloy steel industry including research in both process and physical metallurgy, supervision of customer investigations and failure analyses, customer contact work. Some administrative experience as metallurgist with U. S. Navy. Desires position as plant metallurgist or sales-service metallurgist. Box 10-75.

METALLURGICAL ENGINEER: B.S. degree, age 29, veteran, married. Presently employed. Two years experience in process control and metallography, three years in product development. Desires position in product development or technical sales. Presently located central Ohio, will relocate. Box 10-80.

METALLURGICAL ENGINEER: B.S. degree, age 26, married. Experience includes 3½ years in foundry, heat treating and welding; 1½ years in ordnance research work. Now employed, desires position in any of above fields in New England or Midwest. Box 10-85.

METALLURGICAL ENGINEER: B.S. degree, age 25, married. Engineer-in-Training under Professional Registration Act. Three years experience of diversified engineering work, including protective coatings, electroplating, aluminum heat treating and welding, procedure writing and trouble shooting. Box 10-90.

METALLURGIST: M.S. degree, 17 years as chief metallurgist for companies making cutting tools and associated products. Desires position requiring metallurgical knowledge to produce quality products by efficient methods in midwest. Presently employed. Box 10-95.

METALLURGIST: B.S. degree, age 30. Desires position in metallurgy or production metallurgy in Detroit area. Four years diversified experience in shop and laboratory. Desires responsible position with opportunities for experience and advancement. Box 10-100.

METALLURGICAL ENGINEER: M.S. degree, registered professional engineer. Age 30. Research experience in physical chemistry of steelmaking. Experience in production of iron and steel castings, writing material specifications and supervising manufacturing processes. Presently employed as chief metallurgist. Desires responsible position with progressive organization. Box 10-105.

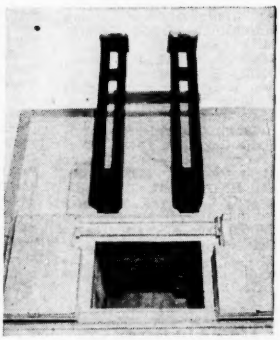
MORE FOR YOUR MONEY

HOLDEN SALT BATHS and INDUSTRIAL POT FURNACES

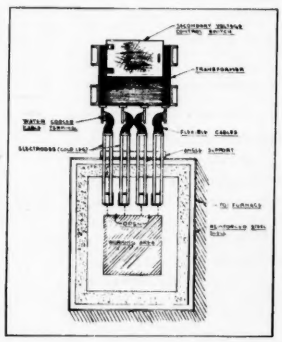
Holden Type 701 Electrode Furnaces

. . . provide these Important Advantages

1. **Electrodes are completely separated** from the working area of the furnace. The brick structure is so designed that it is impossible for work to come into contact with electrodes, either in the basket or work holding fixture.
2. **Electrodes are easily replaceable.** The overhanging ledge permits repair or replacement without disturbing the refractory.
3. **No water cooling of the furnace wall** is required, so there is no power loss with this design.
4. **Split design electrode assembly,** an exclusive development of the Holden Company, provides 80% more area over which to carry secondary current.
5. **A 15 to 20% improved efficiency** is possible when this type electrode assembly plus the flexible braid for transmission of secondary power is used on competitive furnaces.
6. **A single bolt connection for water cooling** the electrode assemblies prevents oxidation of the copper to copper connection. Similarly with such water cooling of these terminals there is no possibility of inducing the heat from the furnace back to the transformer.



HOLDEN TYPE 701-2 Submerged Electrode Unit with removable electrodes.



Drawing of HOLDEN TYPE 701-4 Submerged Electrode Furnace.

● SAVE ONE THIRD On Your Present Furnace

Any competitive furnace using the older type construction can be converted to this design with an electrical saving of approximately 33 1/3%.

INVESTIGATE THE HOLDEN LEASE PLAN

1. It will save you **one-third** over direct purchase and depreciation.
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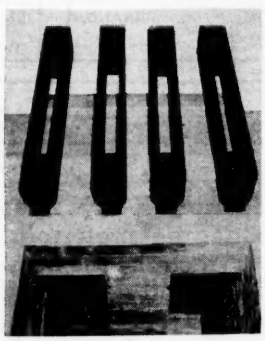
J. B. Carey — at Detroit — Texas 4-8127
M. R. Boyle — at New Haven — State 7-5885

★ *Write for descriptive literature on Holden Type 701 Electrode Furnace.*



HOLDEN TYPE 701-4 Submerged Electrode Unit with replaceable electrodes.

THE A. F. HOLDEN COMPANY

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